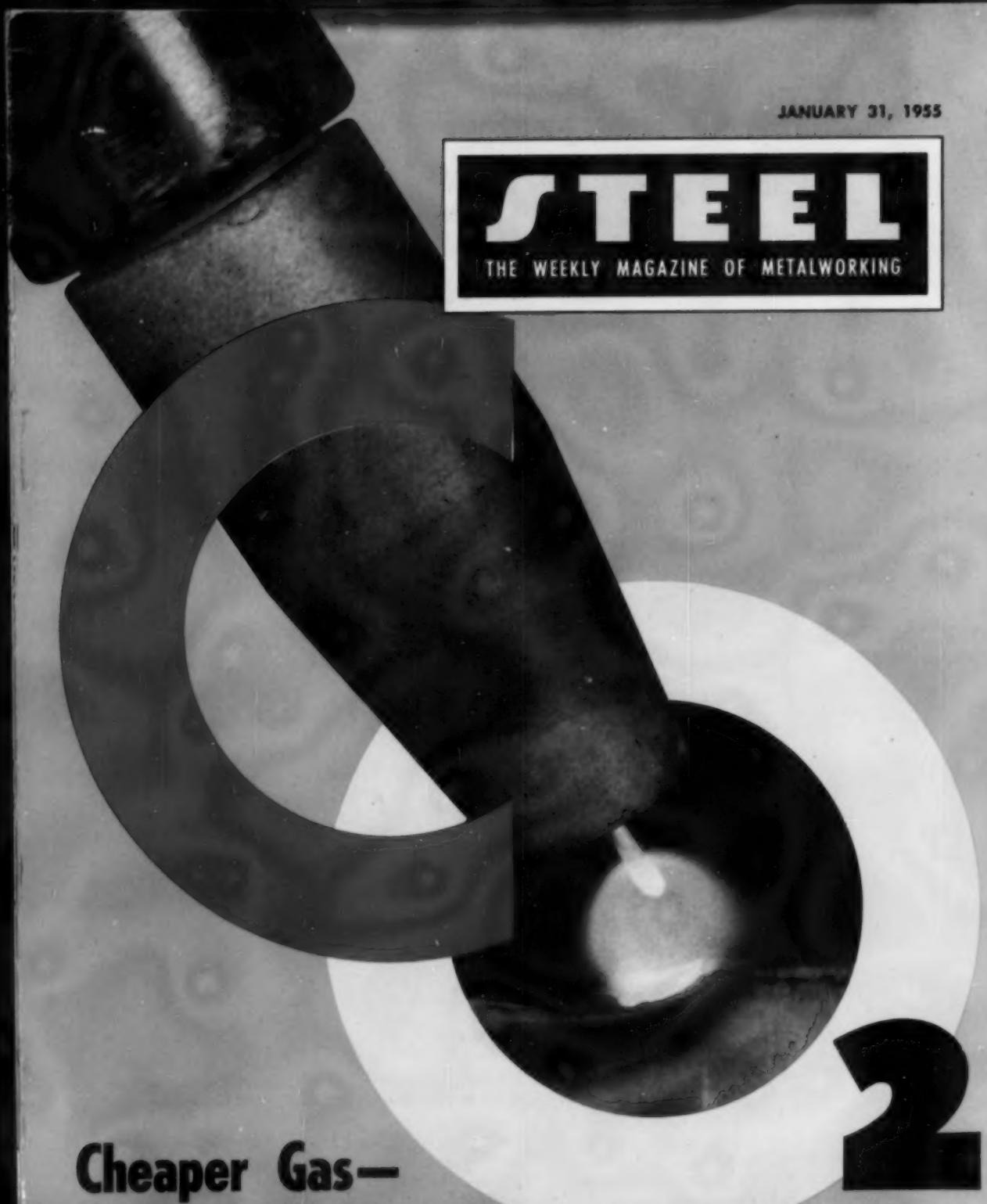
JANUARY 31, 1955

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



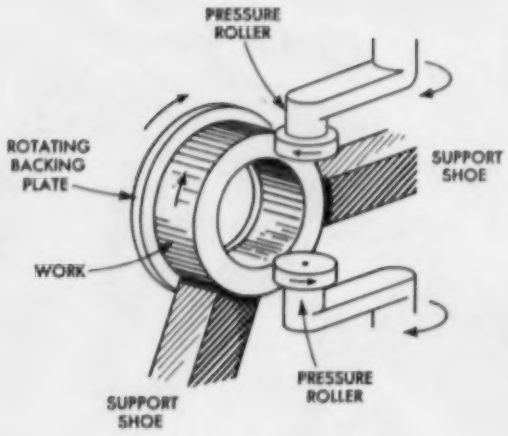
Cheaper Gas— Cheaper Welds

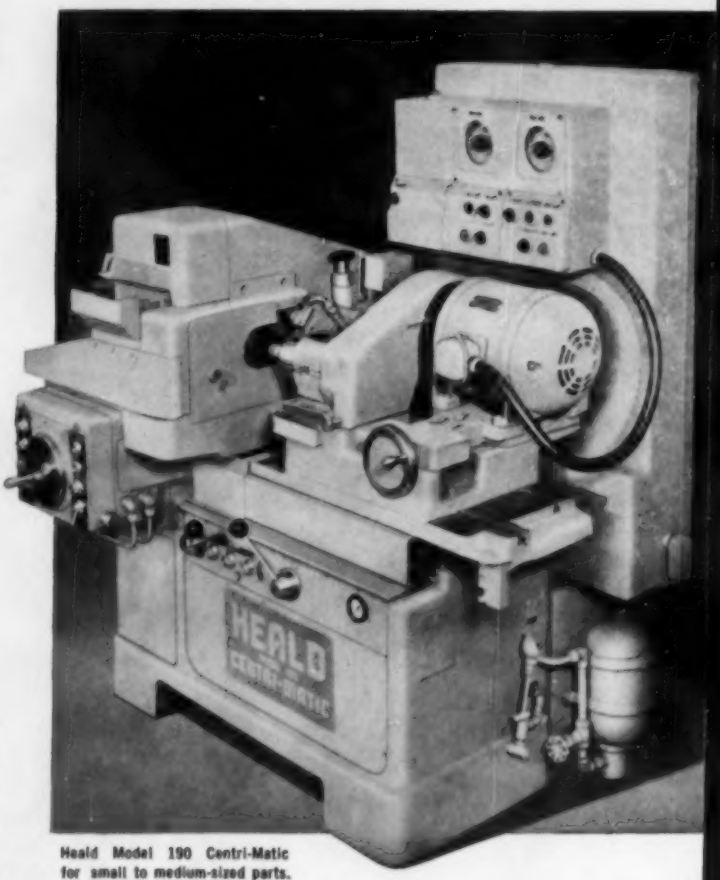
With costs competitive, watch gas-shielded processes grow —page 68

CONTENTS — PAGE 5

MEET THE NEW HEALD

Centri-Matic





Heald Model 190 Centri-Matic for small to medium-sized parts.

Now thoroughly field tested and proved in service, the new Centri-Matic joins the Heald line of fully automatic centerless internals.

Basically, it differs from the roll-type centerless in that the work is located on *fixed support shoes* and is driven by a rotating backing plate against which it is held (see diagram above). The greater contact area of the support shoes tends to bridge any irregularities in the O.D., thus reducing the possibility of reproducing O.D. errors in the ground I.D.

Available in the Model 190 for small or medium-sized work and in the Model 291 for larger parts, the Centri-Matic is ideally suited to conveyor systems and automated work handling devices. Like other Heald internals, it maintains consistent high precision over the longest production runs. Model 190's are designed primarily to operate with central hydraulics in battery setups. Centri-Matic machines are furnished with belt or high-frequency wheelhead drive and with Size-Matic or Gage-Matic sizing method. For complete details, write for Bulletin No. 2-190-1.

The new Centri-Matic is another good reason why IT PAYS TO COME TO HEALD!

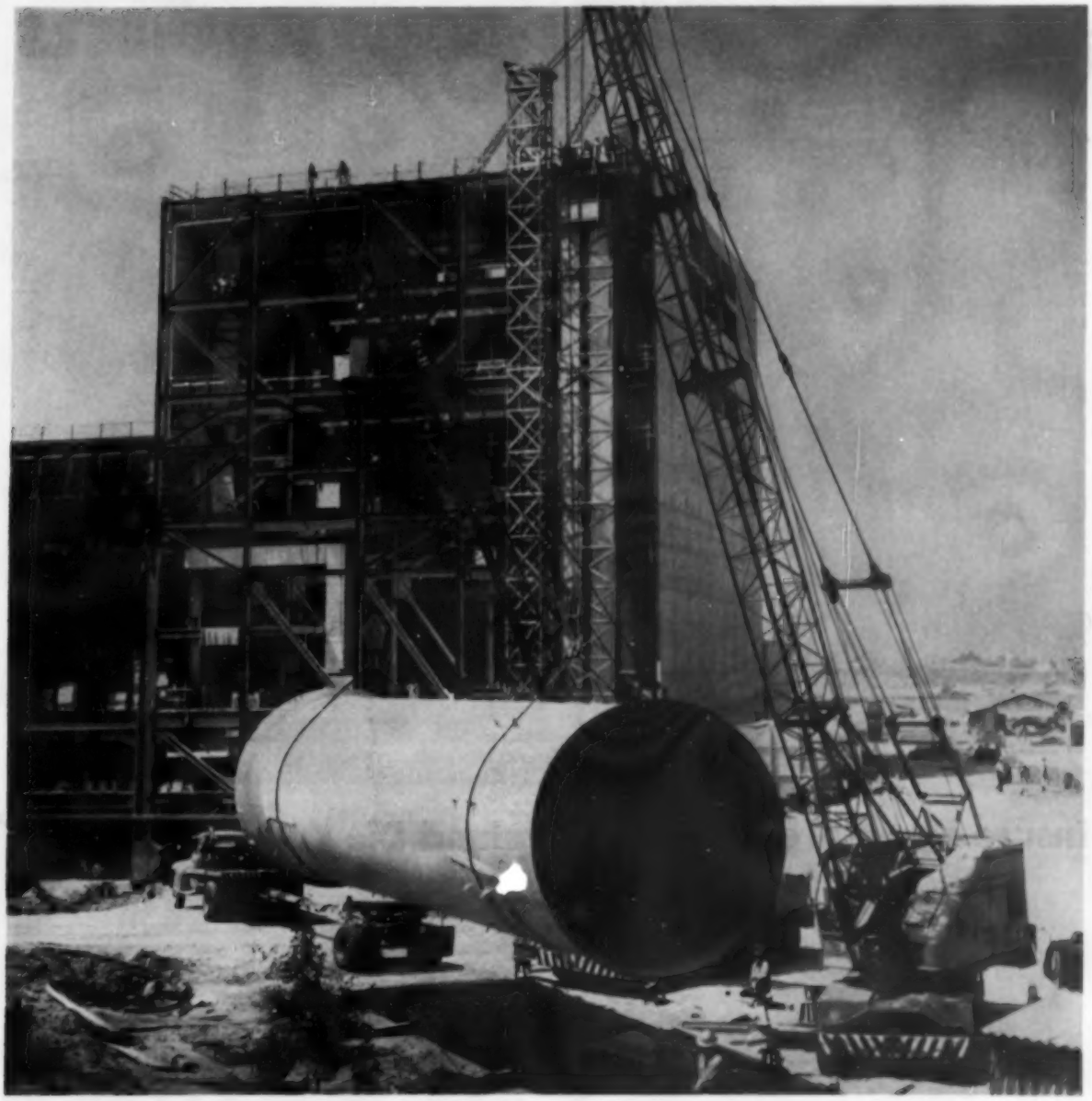
THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Offices in Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

® HEALD

Mayari R makes it lighter... stronger... longer lasting



Steel stack moves to seashore home

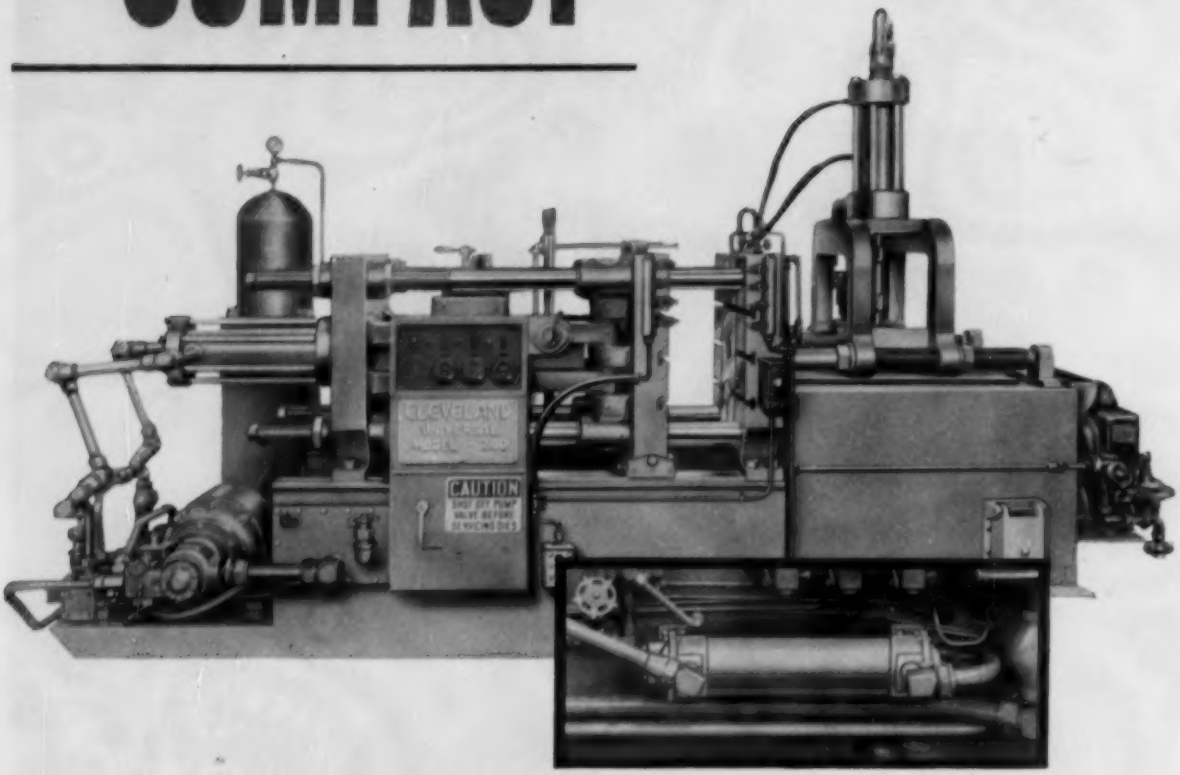
San Diego Gas & Electric Company placed this new steam-electric plant right on the beach near Carlsbad, Calif., to take advantage of ocean water for cooling purposes. The 50-ft stack was fabricated of Mayari R low-alloy, high-strength steel, to offset the dual corrosive attack of salt air from without, combustion fumes from within. Tests conducted both in marine and industrial atmospheres show that Mayari R will far outlast plain carbon steel. This feature together with the numerous other advantages of Mayari R are outlined fully in Catalog 353. Just get in touch with any Bethlehem office for a copy.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

COMPACT ROSS EXCHANGERS



Insure rated pressures of Cleveland Die Casting Machines

With its hydraulic system designed to provide fast injection speed as well as the "squeeze" at the end of the shot, this Cleveland Model 200 Die Casting Machine has a rated locking pressure of 200 tons.

To maintain full capacity of the machine's high-pressure, two stage pump by preventing slippage from overheated, thinned, hydraulic oil, a Ross Type BCF Exchanger has been factory-installed. *Dependable cooling is assured!*

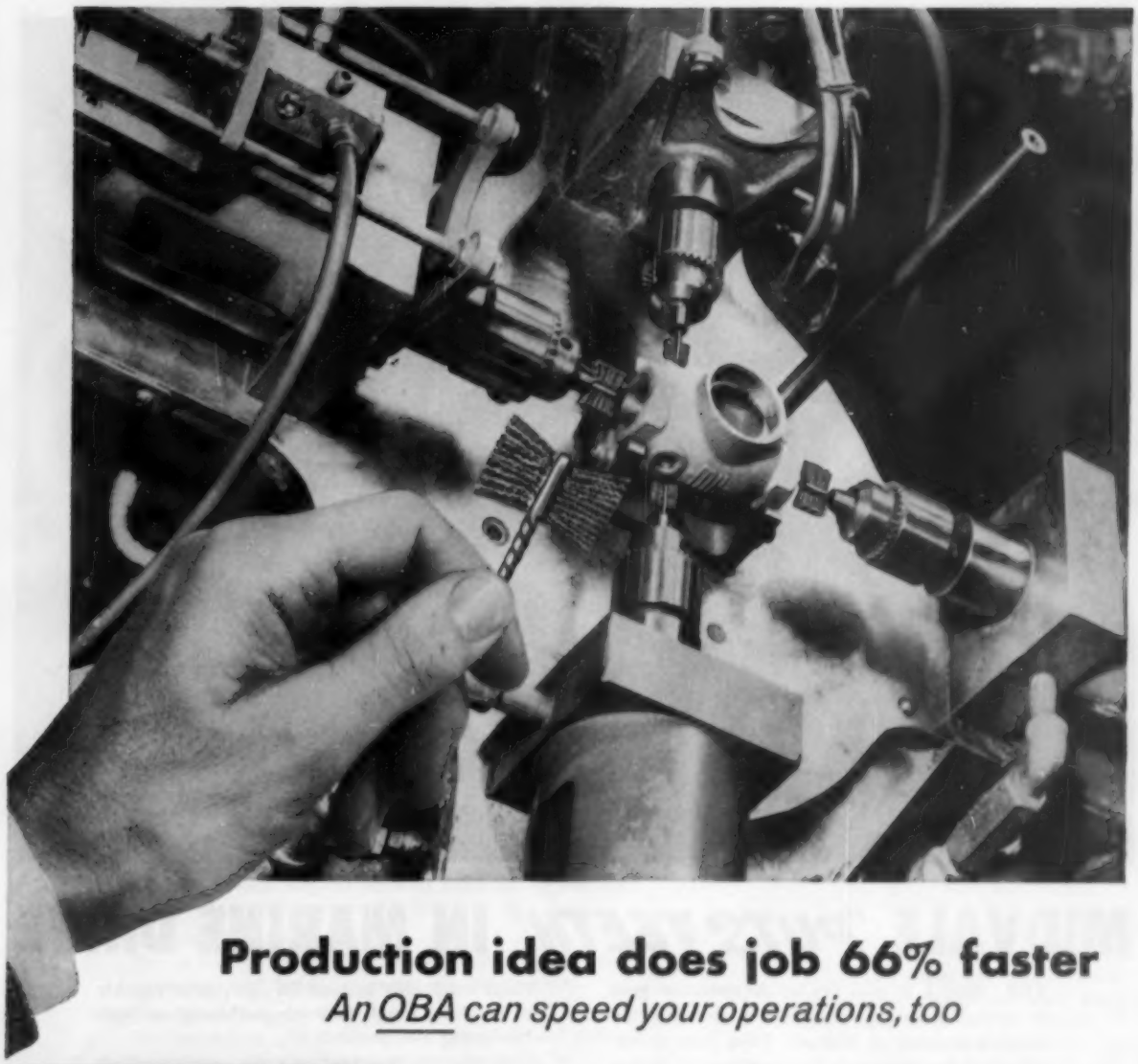
"All models of Cleveland Die Casting Machines use Ross Exchangers because we have found them very efficient in keeping the temperature of the hydraulic fluid constant at all times. Furthermore, the size of the Ross Cooler lends itself to easy mounting on our machine," says The Cleveland Automatic Machine Company.

Unrivaled for thermal efficiency and ruggedness, all copper alloy Ross Type BCF Exchangers are preferred for numerous types and makes of hydraulic machinery. Pre-engineered and fully standardized, they are stocked in a wide range of sizes to meet your needs . . . *promptly*.

For detailed information, request Bulletin 1.1K5.

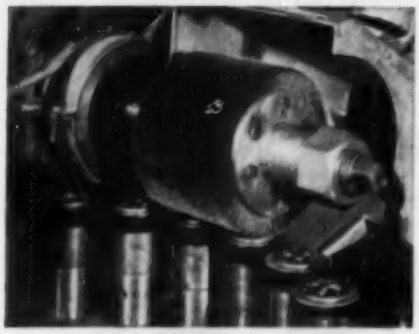
KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1431 WEST AVENUE • BUFFALO 13, N. Y.
In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS



Production idea does job 66% faster

An OBA can speed your operations, too



PRODUCTION UP, COSTS DOWN. *Osborn Economys Brushes finish both sides of brass discs at a 15,000-per-day rate. Another case of power brushing doing a faster, more thorough job than a former hand method.*

HERE, Osborn Power Brushing saves eight manhours per 1000 parts. Before brushing, burrs on threads were removed from each hole by hand. Now, four holes are brushed at one time . . . 66 per cent faster than before. Setup is simple, results are uniform, production steady, cost is less.

Substantial savings can be made on many types of production with Osborn Power Brushing. An **OBA**, **O**sborn **B**rushing **A**nalysis, will show you how. Call or write *The Osborn Manufacturing Company, Dept. G-28, 5401 Hamilton Avenue, Cleveland 14, O.*

Osborn Brushes

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

MIDVALE *"PUTS TEETH"* IN MARINE DRIVE

This 159½" I. D. gear tire for the reduction gear in a high speed marine drive is receiving the rough machining at Midvale. From pour to machining it has been built for toughness . . . higher resistance to wear.

Toughness of forgings at Midvale is achieved by using only the finest part of the ingot originally poured. Experienced forgers shape it up for rugged service using a 6,500 ton hydraulic forging press. Heat treating cycles based on Midvale's long experience are thoroughly followed to produce the maximum in mechanical properties. Final machining is done on equipment capable of handling rough or finish machining on practically any size product.

At Midvale the final gear tire represents only a fraction of the original ingot—73,500 pound ingot was required to make this gear tire which was 15,640 pounds in the rough machined state when shipped. This is one of the reasons Midvale gear tires . . . rings . . . roll shells are noted for their long life. Why Midvale forgings, whether 300 or 300,000 pounds are tough for extra service life and never failing performance. For forgings that last see Midvale first.

THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING
Vol. 136 No. 5 January 31, 1955

✓ NEWS ✓ PRODUCTION-ENGINEERING ✓ MARKETS

Metalworking Outlook 31

The Editor's Views 35

More Domestic Manganese for Steel Industry 39
U. S. reports progress in finding methods to concentrate low-grade ores

A Piggyback Specialist Aims at Higher Volume 42
Rail-Trailer Co. contracts to handle the whole service for Pennsylvania Railroad

Windows of Washington 44

Electric Motor Control Sales in '55 48
Demands of automation will offset over-all decline in new plant. Sales will hit $300 to $330 million

Telegram Tips for Industry 49
How a wire can save you time and money, mean better efficiency and service

Mirrors of Motordom 51

The Business Trend 55

Men of Industry 59

Technical Outlook 67

CO_2 Means Cheaper Gas-shielded Welds 68
Carbon dioxide can cut costs as much as 70 per cent. Here's why welding engineers like it

Heat Treating Tool Steels: Part II 72
This article in the Modern Heat Treating Series covers quenching and tempering water hardening types

Why Use the Salt Spray Test 76
This procedure still has merit in spite of well-defined limitations. Here are some reasons for using it

Progress in Steelmaking 82
Dust is removed by electronic precipitators from a motor room. Result: Tailored atmospheric conditions

Where Heat is King: Part I 86
There's room for improvement in high temperature materials. Here's where we stand today

New Products and Equipment 91

The Market Outlook 97
Metal Prices and Composites begin on Page 98

Nonferrous Metals 100

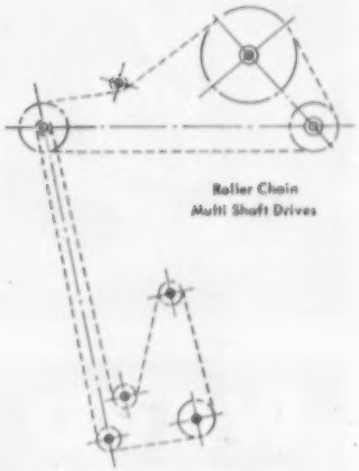
Behind the Scenes 6
Letters to the Editors 10
Calendar of Meetings 27
Foreign News 47
Obituaries 62
Helpful Literature 95

Editorial, Business Staffs—16. Advertising Index—127. Editorial Index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, O. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $7.50; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Accepted as controlled circulation publication at Cleveland, O. Copyright 1955 by Penton Publishing Co.

ACME CHAIN

Roller Chain
ENGINEERING SERVICE
'Yours'
FOR THE ASKING



Acme engineers will gladly work shoulder to shoulder with your designers to plan the details of sprocket, ratio, chain impact, tension, drive speed and other factors necessary to obtain the maximum efficiency and economy on your project.

WRITE OR PHONE JEfferson 2-9458

Write Dept. 10-Q for new illustrated 76 page catalog on use and application of roller chains and sprockets.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

Your machining department for hardened and precision ground screw machine products. Send for brochure & equipment list.

Ottawa

OSP INC. OTTAWA STEEL PRODUCTS

STEEL PRODUCTS INC.
Grand Haven
Michigan

WARD STEEL CO.

We specialize in
FINISHED STEEL
BARS—TUBES—STRIP

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL

We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

87A Rindge Ave. Ext. Phone UN 4-2460
CAMBRIDGE 40, MASS.

Branches
3042-3058 W. 51st Street, CHICAGO, ILL.
Phone: Grove Hill 6-2600

Fenner Street, Providence, R. I.
Phone: Gaspee 1-5573, 1-8573

behind the scenes

Some Fresh Air, Please

A wonderful article in FORTUNE concerning the brain reminded us of a story concerning Dr. Sam Johnson, which reminded us of our redoubtable Washington Editor, Ed Kreutzberg. It's all very simple, really. We couldn't make much sense from the news that nerve impulses reverberated around closed loops of neurons, so we began checking definitions and promptly got lost: you fool around with a medical dictionary, and pretty soon you won't know which end is up. Well, definitions brought to mind the celebrated lexicographer's statement that "oats is a grain used for horses in England but for people in Scotland", and that brought Johnson himself into the picture: hulk, soiled linen, scrofula scars, body odor and all. Ever the perfectionist in the correct use of words, he rebuked a lady who complained that he smelled. "Beg pardon, Madame," he explained. "I stink; you smell."

All of which brings us to Ed Kreutzberg and a remarkably interesting stink that hung about STEEL's editorial offices last week. For years Ed had been an easy mark for tobacconists, and so it came about that the Kreutzberg desk slowly filled with cans of strange and weird tobaccos—and it also came about that eventually Ed gave up smoking. He gathered together all his untouched tobacco — 108 cans — and sent them to the Cleveland office with his compliments. Pipe smokers converged about the loot and began firing up Irish Wolfhound, Louisiana Perique, Craven Curly Cut and other fantastic brands. Presently a heavy fog settled about the editorial rooms, and the formidable aroma remained until the ladies formed squads and flung open all the windows.

Local Genius

"Full many a flower is born to blush unseen," sang Mr. Coleridge. Man, he said that right: he might have been talking about Andy Bugosh, Sales Promotion Manager of STEEL's sister publication, New Equipment Digest. That boy borders on genius classification. A few weeks ago we made some silly remark to the effect that "be that as it may" was a ridiculous expression, and expressed sympathy for anybody attempting to translate the thing into Kurdish or Japanese. Almost before we could say "Jack Robinson" in Swahili, Andy walked into our coop, dipped a brush into the inkpot, and wrote:

それは然うと

"That's Japanese," he said, blinking a pair of eyes as large and as bright as silver dollars. "I don't know Kurdish".

We regard Mr. Bugosh with amazement. How many persons do *you* know—aside from Japanese, of course—who can flip a mental switch and make with the Hirohito talk? Why, you can't hardly get those no more.

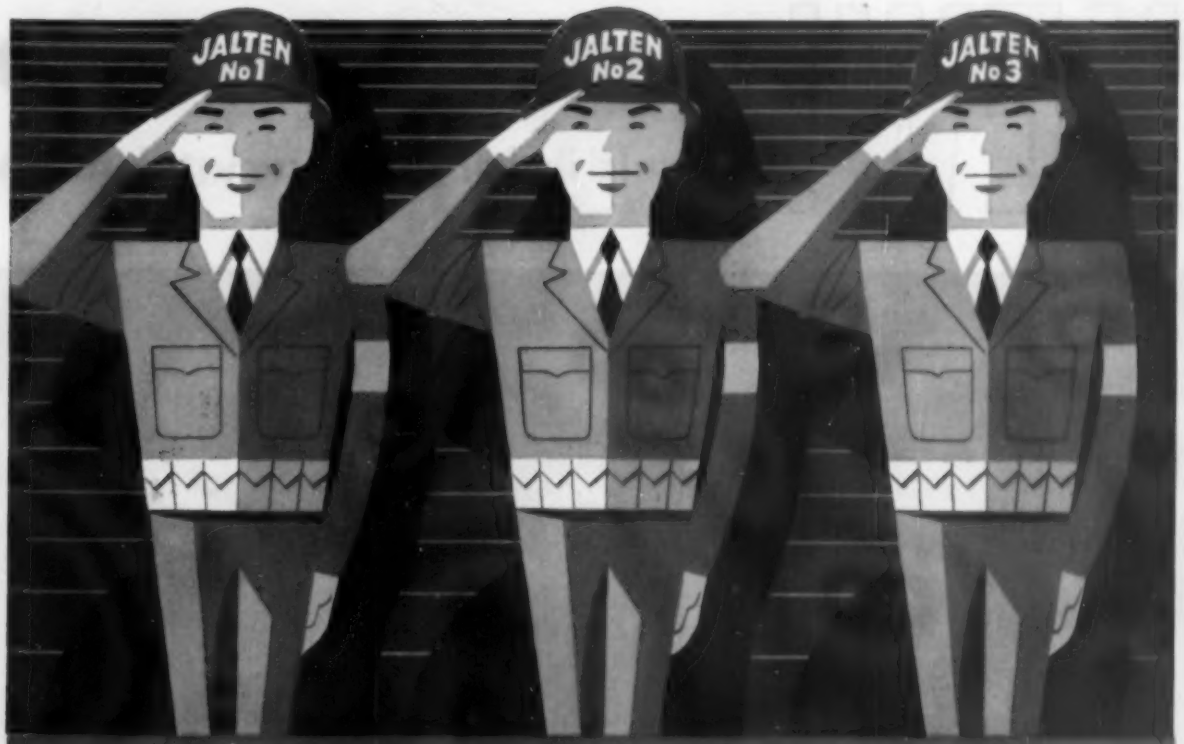
Saved By a Scratch

In New York several days ago Associate Editor Bob Jaynes learned to his great distress that the old time song writer knew exactly what he was talking about; every little movement has a meaning all its own. Bob and New York Editor Sam Baker were prowling about Manhattan, enlarging their comprehension and taking in the sights, when they managed to gain entrance to the Cotton Exchange. Somebody at an octagonal desk in the pit kept up a steady barrage of shouts at the trembling speculators, who offered or increased their bids by gestures; the auctioneer, apparently, knew what every movement meant.

Bob noticed something unusual across the arena, and he called Sam's attention to it by pointing. The auctioneer immediately directed his remarks to Bob, and screamed something like beedle-eedle-eedle, sold, the American Tobacco Co. Before Jaynes was hooked, another man scratched his nose—and that's why Bob didn't come back to Cleveland the unhappy owner of several carloads of cotton.

Shrdlu

(Metalworking Outlook—Page 31)



Give your order...

THEY'RE ALL JALTEN!

J&L's New JALTEN series enables you to select low-alloy, high-strength steel in the following combinations of advantages:

JALTEN No. 1 — High strength, good formability and fabricating —good resistance to low temperature impact.

JALTEN No. 2 — High strength, moderate forming—improved resistance to atmospheric corrosion.

JALTEN No. 3 — High strength—improved resistance to abrasion.

Remember to specify JALTEN High Tensile Steel for

- **HIGH STRENGTH • RESISTANCE TO CORROSION**
- **GOOD FORMABILITY • RESISTANCE TO ABRASION**

J&L STEEL

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

The data you want is in this book:

- Chemical Properties of Jalten
- Mechanical Properties of Jalten
- Jalten Equivalents
- Jalten Application Data

Jones & Laughlin Steel Corporation
Dept. 404, 3 Gateway Center, Pittsburgh 30, Pa.

Please forward a copy of your booklet, Jalten low-alloy, high-strength steel.

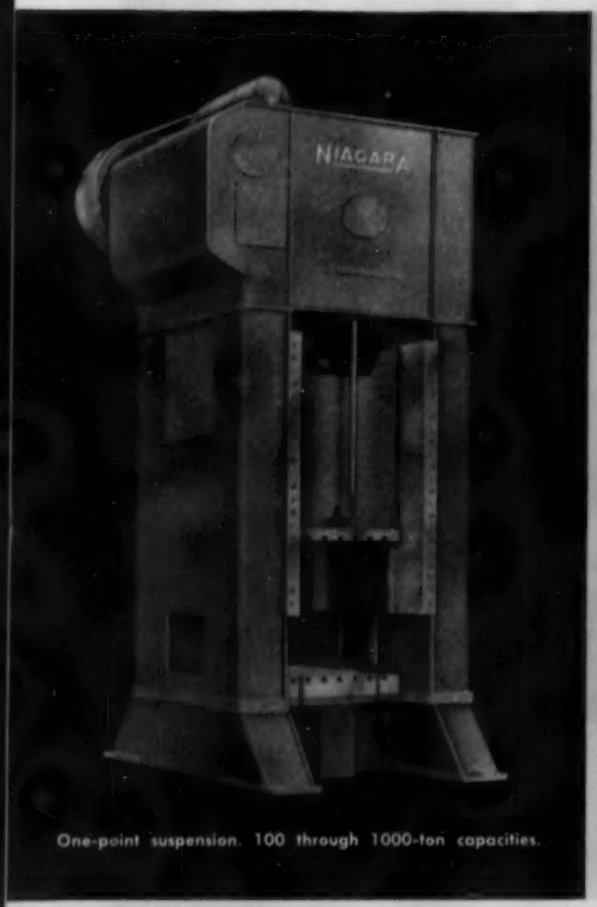
Name _____

Company _____

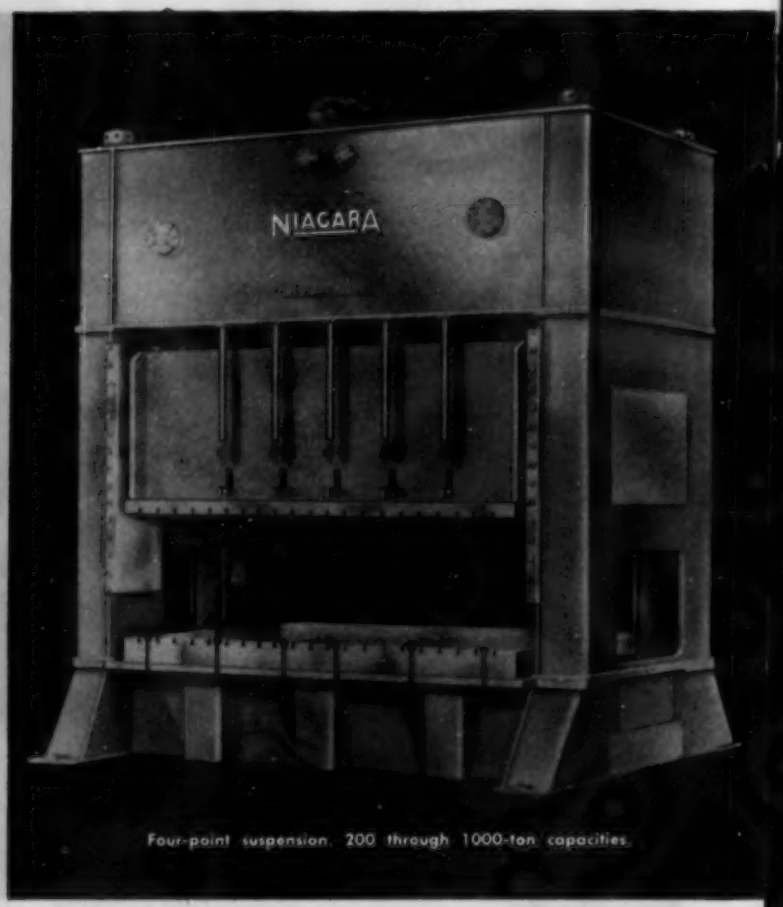
Address _____

NEW! MASTERFULLY ENGINEERED

excels in large, heavy tonnage



One-point suspension. 100 through 1000-ton capacities.



Four-point suspension. 200 through 1000-ton capacities.

ECCENTRIC DRIVE DELIVERS GREATER TORQUE WITH LESS DEFLECTION

In Niagara Series SE Presses, the eccentric is an integral part of the main gear (or gears) which rotates on a stationary pin rigidly supported in the crown, close to the point at which the pressure is exerted. Serving merely as a pivot, the pin carries no torsional load and relatively little bending load. Net result: Niagara's eccentric gear design can deliver greater torque with less deflection than other types of construction.

RUGGED, RIGID, ALL-STEEL FRAMES PROVIDE GREATER ACCURACY, LONGER DIE LIFE

Frames are rugged, all-steel, four-piece, tie-rod construction of great strength and rigidity, stress relieved in a furnace and thoroughly grit-blasted before machining. Each frame size has been scientifically tested for deflection to meet Niagara standards — the most exacting in the industry.

LOW INERTIA, PNEUMATIC FRICTION CLUTCH RUNS COOLER, WEARS LONGER

Most of the weight of the Niagara clutch continues to rotate with the flywheel. Only the drive shaft and driving plate start and stop with each cycle. The resulting low weight and inertia of the parts, picked up during clutch engagement, greatly reduce heat and wear. As the clutch rotates, it acts as a centrifugal blower, providing positive ventilation. Plates automatically compensate for normal wear, with no adjustment necessary.

MODERN, STREAMLINED DESIGN EMPHASIZES COMPACTNESS

The entire driving assembly is neatly housed in the crown. There is no exposed, overhanging flywheel, clutch, brake, shaft nor motor in the rear of the press to obstruct crane service, block light, throw grease or consume space unnecessarily.

LINE OF METALWORKING CHAMPIONS

drawing, punching and blanking work

Two-point suspension, 200 through 1000-ton capacities.

Without equal in engineering design, performance and stamina, this great new line of Niagara Straight Side Eccentric Geared Presses is every inch a champion. It is an outstanding example of the advanced thinking that has made Niagara the pace-setter among builders of metal working machines for 75 years.

Masterfully engineered and ruggedly constructed to handle a tremendous variety of work, the new Niagara SE Series is the most practical and dependable press line built for:

- Work requiring large die areas.
- Heavy tonnage demands.
- Long stroke, deep drawing jobs where work is engaged high up on the stroke.
- Bottom-of-stroke blanking and punching.

THE COMPLETE STORY IS READY FOR YOU NOW!
Make a feature-by-feature appraisal of what these great new presses can do for you. Write for newly published, illustrated Bulletin 66. It will be forwarded promptly without obligation.

NIAGARA MACHINE & TOOL WORKS • BUFFALO, 11, N.Y.
DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK • PHILADELPHIA
Dealers in principal U. S. cities and major foreign countries.

DELUXE OPERATING CONTROLS INSURE UTMOST SAFETY, EFFICIENCY AND CONVENIENCE

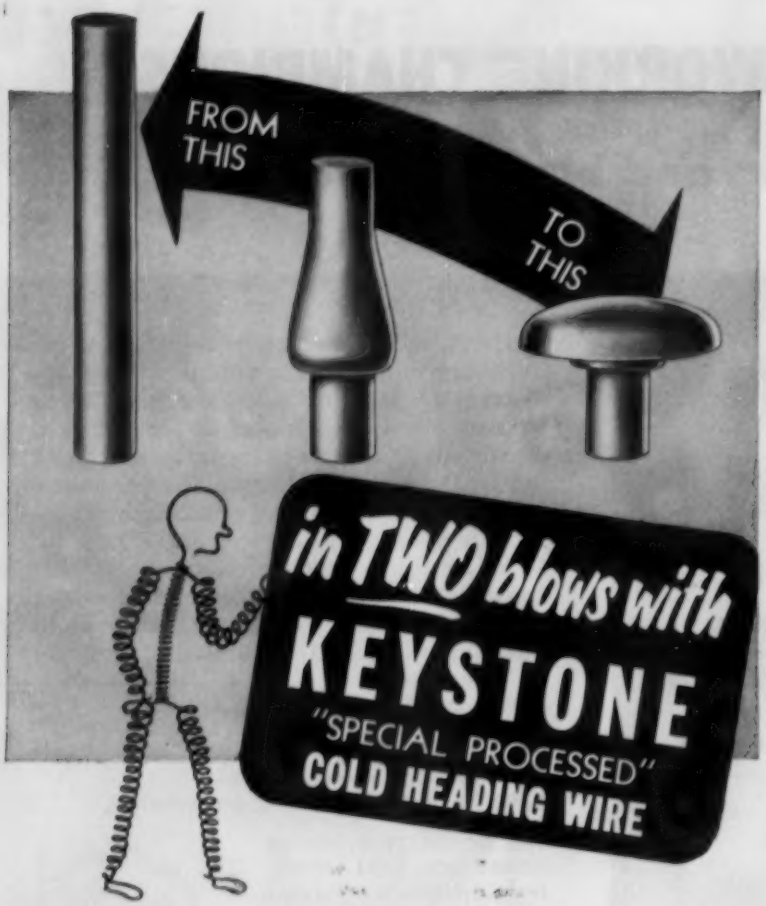
Compactly and conveniently arranged on a master panel, Niagara controls are instantly accessible for fingertip direction of every press operation: starting, slide adjusting, jogging, die tryouts, running and stopping. The latest safety devices provide maximum protection for die setter, operator and the press itself. Nothing has been overlooked. Trial runs assure that all controls are in proper working order before each Niagara press leaves the plant.

NIAGARA

STRAIGHT SIDE
ECCENTRIC GEARED
PRESSES

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

NIAGARA MACHINE & TOOL WORKS 1879 75 1954



Forming the above Special Pan Head Bolt in two blows presented a difficult cold heading problem that was solved by the use of Keystone "Special Processed" Cold Heading Wire.

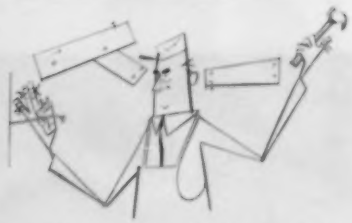
The superior grain flow characteristics of "Special Processed" Wire provided the necessary upsetting and die forming qualities to withstand the terrific displacement of metal during the two blow process. The head was formed without buckling, distortion or cracking — longer die life, increased production, and a higher quality finished product resulted.

Carefully selected ingredients — our own exclusive drawing and heat treating process — rigid quality controls and inspections — give this wire unsurpassed performance on any unusually difficult cold heading job. Your inquiry is welcomed.

Keystone Steel & Wire Company
Peoria 7, Illinois
Industrial Wire Specialists

LETTERS
TO THE EDITORS

Do-It-Yourself Management



This is a long delayed letter to tell you how much I enjoyed your Dec. 13 editorial, p. 53, "Do-It-Yourself Management," by Walter J. Campbell, managing editor. I wish this kind of thing could be said over and over.

I was recently at a conference where Ted Repplier, of the Advertising Council, talked about the desirability of making Europeans understand that American-type capitalism is different from what the Europeans understand capitalism to be.

I am sending your editorial along to him because I think it admirably sums up the most important phase of American capitalism.

C. B. Larrabee
chairman of the board
Printers' Ink Publishing Co.
New York

• *To Mr. Larrabee, one of business journalism's top editorial writers, our professional thanks.—ED.*

If you would send us 425 reprints of the editorial, "Do-It-Yourself Management," we will be glad to mail them to members of our organization at home and abroad, in all departments of our business, to whom we believe this statement would be interesting and thought provoking.

Malcolm McCormick
vice president
Fram Corp.
Providence, R. I.

• *Sorry, our supply of reprints of that editorial is exhausted. We suggest having the page printed by offset or, if you prefer, we could have it done for you here.—ED.*

Being Primed on Pumps

We notice in the Dec. 27 "Business Trend" column, p. 47, the Hydraulic Institute is given as the source of information supplied for new orders of pumps. We would like to get the address of that institute.

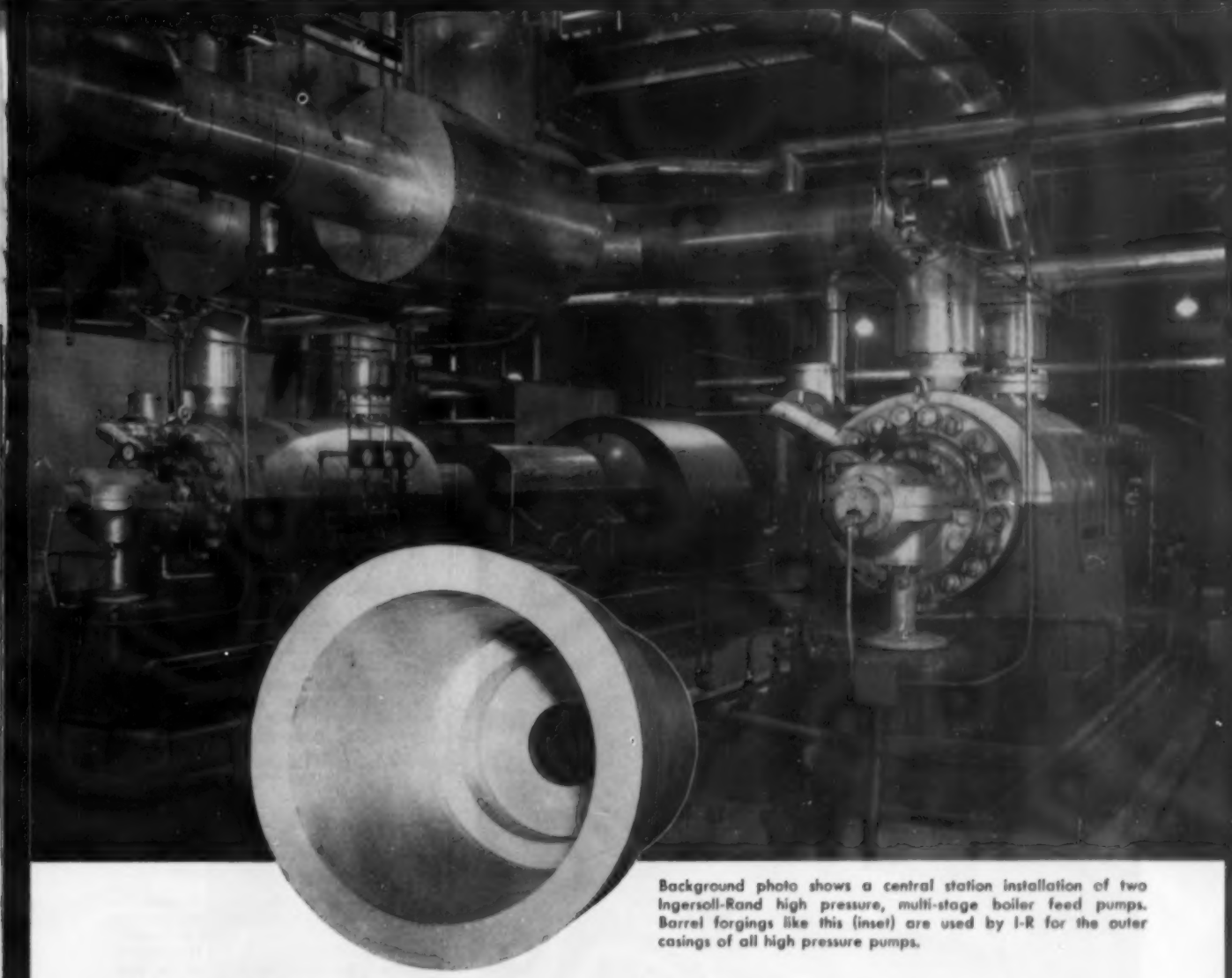
R. D. Speigle
Piqua Machine & Mfg. Co.
Piqua, O.

• *It's Frank Anderson, secretary, Hydraulic Institute, 122 E. 42nd St., New York 17.—ED.*

Upgrading the Foreman

We would like to get 12 copies of your article, "The Foremen—Make Them Managers," No. 9 in STEEL's 1954 Program for Management series. This

(Please turn to page 12)



Background photo shows a central station installation of two Ingersoll-Rand high pressure, multi-stage boiler feed pumps. Barrel forgings like this (inset) are used by I-R for the outer casings of all high pressure pumps.

Ingersoll-Rand tells how:

STEEL FORGINGS HELP GIVE LONG LIFE TO HIGH PRESSURE BOILER FEED PUMPS

Ingersoll-Rand Class CHTA boiler feed pumps are widely used in high pressure central power generating stations throughout the world. They are double-case units, the inner assembly containing the rotor and fluid passages and the outer casing providing the pressure vessel to enclose this pumping unit.

For service under high pressures and temperatures, Ingersoll-Rand uses steel forgings for the outer casing of these boiler feed pumps. Since Standard Steel forges these outer barrels from solid billets of high carbon steel, they have a close grained, homogeneous structure. That's a big reason why Ingersoll-Rand double-case pumps have established a reputation for long, trouble-free service with sustained high efficiency.

Very likely, you can improve *your* products by using Standard Steel barrel forgings, rolled rings, flanges or other forgings. Our engineering and metallurgical departments have helped solve many diverse problems. Please write us about yours.

Standard Steel Works Division

Burnham (Mifflin County), Pa.

BALDWIN-LIMA-HAMILTON

General Offices: Philadelphia 42, Pa. Offices in Principal Cities

rugged construction
Automatic Shears
by HALLDEN
"the shearing specialists"
THE HALLDEN MACHINE COMPANY
THOMASTON, CONNECTICUT
Sales Representatives
The Wean Engineering Co., Inc. (Ferrous) Warren, Ohio
T. E. Dodds (Non-Ferrous) Pittsburgh, Pa.
W. H. A. Robertson & Co., Ltd. (Ferrous & Non-Ferrous) Bedford, England

LETTERS

(Concluded from page 10)

is a most interesting discussion of the role of the foreman, which we would like to distribute to our works manager and his supervisors.

Nevin J. Rodes
Conveyor Division
Jeffrey Mfg. Co.
Columbus, O.

• *Sent.—ED.*

Facts & Figures for '55

Each year the executives in our company have found it useful to have a copy of your current "Metalworking Facts and Figures" at their desks. As soon as possible, may we have ten copies of the 1955 section?

William S. DuBois
manager of market research
Harbison-Walker Refractories Co.
Pittsburgh

• *Sent.—ED.*

Make It Right

We notice in your Jan. 10 issue, p. 26, an article concerning our quality improvement program, "Make It Right," which was written by C. W. Hosterman, who was our plant manager at the time this program was put into effect. (It's an industrial adage that workers who know the results of their labors take more pride in their jobs.)

We would like six additional copies for distribution to our supervisory personnel.

J. Paul Symons
supervisor of personnel
Sylvania Electric Products Inc.
Shawnee, Okla.

• *Sent.—ED.*

For Tougher Castings

Please send me a tear sheet of the article, "Pearlitic Malleable: Castings for Tougher Jobs," which appeared on p. 62 of the Jan. 10 issue. (The secret of the stronger iron is not only in the control of the melting process. Heat treatment of the castings is more important.)

Robert H. Wendt
vice president & general manager
Kiekhaefer Aeromarine Motors Inc.
Fond Du Lac, Wis.

I would appreciate reprints of this fine article . . .

Ralph V. Kretzer
production manager
Lake City Malleable Inc.
Cleveland

• *Sent.—ED.*

More than meets the eye

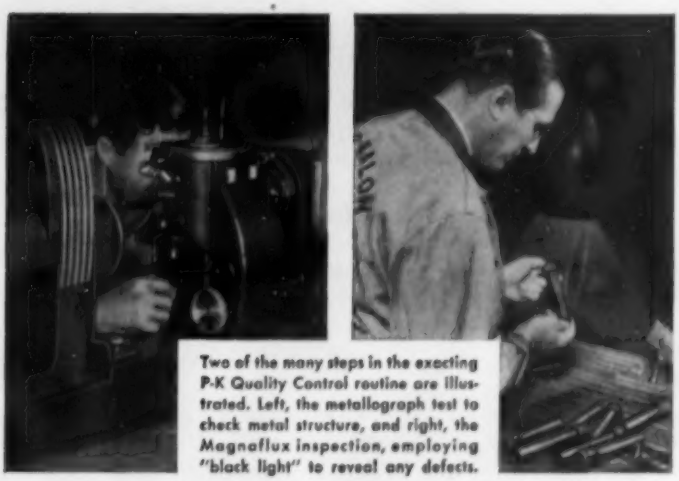
P-K Socket Screws, at a glance, may look substantially like those you buy from "habit." You have to "look *beyond* the hex" for the difference.

If you don't, you are buying with a "blind spot" that can block your way to *proved* benefits other buyers are using to advantage. Parker-Kalon's exacting Quality Control is only one of the advantages you don't see until you "look beyond the hex."

Look Beyond the Hex

Compare every detail of product and service. Compare for advanced design . . . for proved assembly strength . . . for buying aids, and supply service. Get all the facts, and try P-K Socket Screws. You'll find they take top rating in any test.

Get samples, information from your P-K Distributor, or write: Parker-Kalon Division, General American Transportation Corporation, 200 Varick Street, New York 14, N. Y.



Two of the many steps in the exacting P-K Quality Control routine are illustrated. Left, the metallograph test to check metal structure, and right, the Magnaflux inspection, employing "black light" to reveal any defects.

FOR TOP QUALITY and tolerance gaged to your most exacting specifications — and guaranteed.

FOR ADVANCED DESIGN that speeds assemblies — makes them simpler, stronger — and saves errors.

FOR ASSEMBLY STRENGTH okayed in a million punishing tests by thousands of satisfied users.

FOR PLANNING AIDS and buying data patterned to your special needs, plus advice on assembly.

FOR SUPPLY SERVICE set up for fast action and lower purchasing expense — by local Distributors.

FOR ANY STYLE OR SIZE You'll find any Socket Screw you need in P-K's complete line. Hex Keys in all sizes, and several handy sets.

PARKER-KALON SOCKET SCREWS

GET ALL THESE ESSENTIALS OF COST-WISE ASSEMBLY GET P-K

In Stock . . . see your nearby P-K Distributor . . . your local Supply and Service Specialist

2 Stainless Parts...

made to the same specs... *but what a difference!*

Tool life increases 33%

This shaft winds the main spring that powers parking meter clocks. When produced from ordinary Type 303 Stainless, machinability was a constant problem . . . tool life was short. Then the company made just *one* change—to Carpenter Stainless No. 8 (Type 303). Now machines run ⅓ longer before tools have to be removed for resharpening.

Unit costs go down

In addition to the savings gained by longer tool life, the uniform, free-machining qualities of Carpenter No. 8 (Type 303) have helped make this job more economical. Now, material can be run at a higher speed. Close tolerances are more easily held.

Top corrosion resistance obtained

Although machinability was the prime factor for changing to Carpenter No. 8, the shaft had to be corrosion resistant to provide dependable performance when exposed to varying atmospheres in all parts of the country. And Carpenter Stainless No. 8 assured this property.

This is just one example where the difference in Carpenter *quality* and dependability pays off. It's a difference that can add up to speed, performance and profits right in your own plant. See for yourself—specify Carpenter on your next order for Free-Machining Stainless. THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

take the problems out of production

. . . change to Carpenter STEEL — **Free-Machining Stainless**

IMMEDIATE DELIVERY from local warehouse stocks!
Export Department: The Carpenter Steel Co., Port Washington, N.Y.— "CARSTEELCO"

PUNCHING

104 holes every 10 seconds *accurately*

The multiple punching of these holes must be very rapid, and their location as well as spacing must be held accurately.

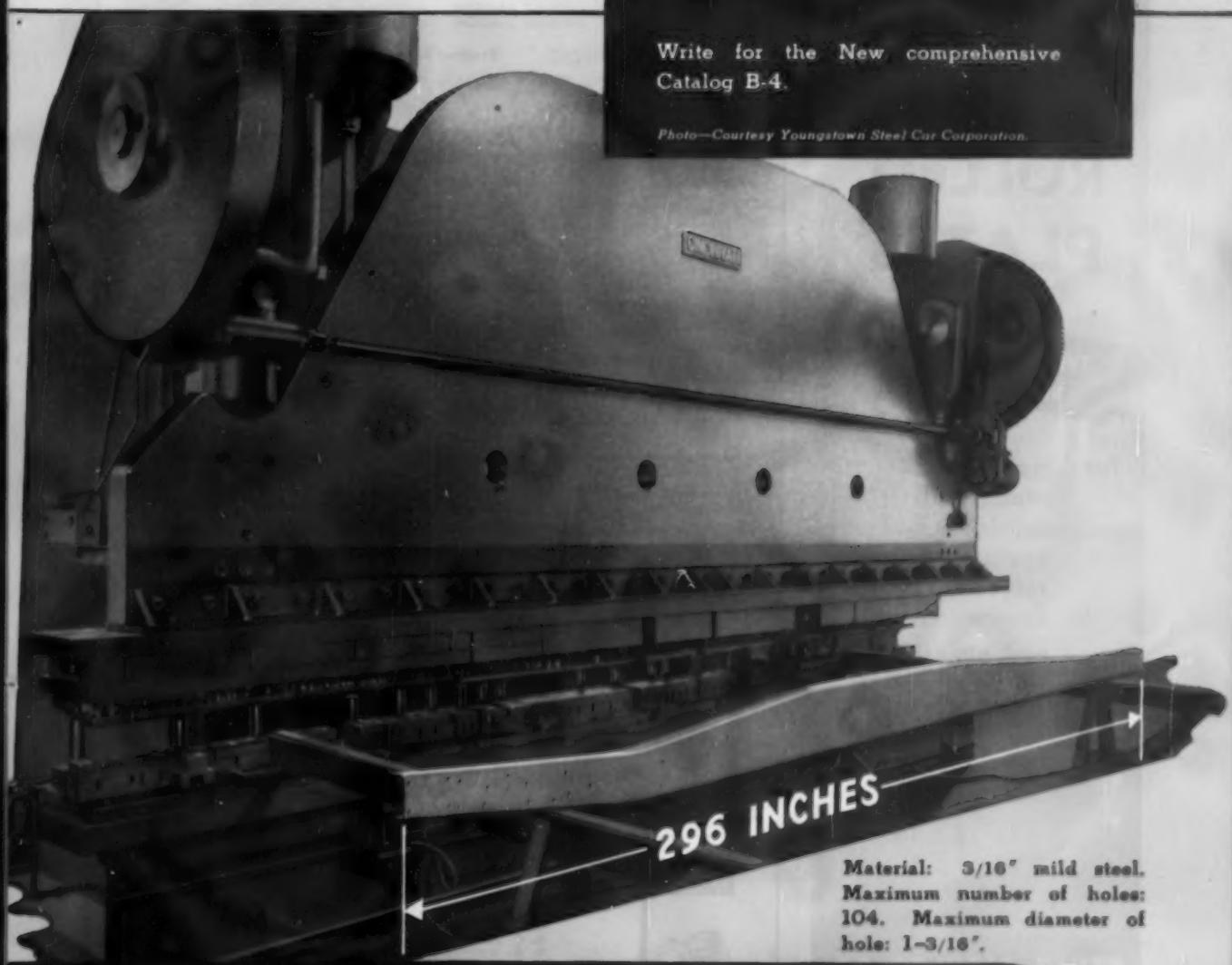
The assembly of these 24' trailer frames is smooth and economical with no costly hand fitting.

With this punching equipment, position, size and spacing of holes may be changed quickly and at low cost.

The Brake can perform many other operations as desired converting from one operation to another quickly and at low cost.

Write for the New comprehensive Catalog B-4.

Photo—Courtesy Youngstown Steel Car Corporation.



Material: 3/16" mild steel. Maximum number of holes: 104. Maximum diameter of hole: 1-3/16".

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

LONG life . . . LOW maintenance . . . LEAST cost per year . . .

MANGANAL

T. M. Reg. U. S. Pat. Off.

11%-13½%
MANGANESE-NICKEL STEEL

HOT ROLLED PLATES

THE TOUGHEST METAL . . . NOT HARMED BY HEAT

for: *maintenance, repair and fabrication of equipment subject to severe impact and abrasion*

- Tensile strength up to 150,000 psi.
- Workhardens up to 550 Brinell.
- Available 1/4", 5/16", 3/8", 1/2", 5/8", 3/4", 1" thick.
- Stock sizes: 48" x 144", 60" x 120". Other sizes on request.

WRITE TODAY . . . for detailed specification bulletin.

Nearest Distributor on Request.

STULZ-SICKLES CO.
SOLE PRODUCERS
95 N.J. Railroad Ave., Newark 5, N.J.

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Editor, IRWIN H. SUCH
Managing Editor, WALTER J. CAMPBELL
Assistant Managing Editors, VANCE BELL, JOHN S. MORGAN

WILLIAM M. RODNEY ..... *Market Editor*
J. D. KNOX ..... *Steel Plant Editor*
ALLEN G. GRAY ..... *Technical Editor*
ROBERT F. HUBER ..... *Machine Tool Editor*
HARRY E. CHANDLER, JR. ..... *Copy Editor*

FRANK R. BRIGGS ..... *Associate Editor*
THOMAS F. HRUBY ..... *Associate Editor*
ROBERT O. JAYNES ..... *Associate Editor*
VAN CALDWELL ..... *Associate Editor*

ARTHUR W. ZIMMERMAN ..... *Assistant Editor*
JAMES P. MORRISSEY ..... *Assistant Editor*
AUSTIN E. BRANT ..... *Assistant Editor*
MICHAEL A. L. WEBSTER ..... *Assistant Editor*
STANLEY B. STEWART ..... *Assistant Editor*
MARY T. BORGERHOFF ..... *Assistant Editor*
MARY ALICE LYMAN ..... *Assistant Editor*

BARBARA DAVIS ..... *Editorial Assistant*
MARY ANN STUVE ..... *Editorial Assistant*
JEAN MCNAMEE ..... *Editorial Assistant*
EILEEN CORTES ..... *Editorial Assistant*

Resident Editors

New York 17 ..... 60 East 42nd St.
B. K. PRICE, L. E. BROWNE
Murray Hill 2-2581

Chicago 11 ..... 520 North Michigan Ave.
ERLE F. ROSS, WILLIAM E. DEAN
Whitehall 4-1234

Pittsburgh 19 ..... 2837 Koppers Bldg.
ROBERT M. LOVE
Atlantic 1-3211

Detroit 26 ..... 1249 Washington Blvd.
FLOYD G. LAWRENCE
Woodward 3-3488

Washington 4 ..... 1123 National Press Bldg.
E. C. KREUTZBERG
Executive 3-6849

London, 2 Caxton St., Westminster S. W. 1
VINCENT DELPORT
European Editor

Editorial Correspondents

Birmingham ..... R. W. KINCEY
Birmingham 3-1121
Buffalo ..... L. G. FELDMANN
Cleveland 5353
St. Louis ..... MAC L. HUTCHENS
Republic 7752
Youngstown ..... GEORGE R. REISS
Riverside 7-1471
Los Angeles ..... NORMAN LYNN
Webster 5-3040
San Francisco ..... EDWIN HAVERTY
Yukon 6-5151
Seattle ..... R. C. HILL
Melrose 1895
Cincinnati ..... JACK DUDLEY
Beechmont 7508
Toronto ..... F. S. TOBIN
Empire 4-9655
Birmingham, Eng. ..... J. A. HORTON
Paris, France ..... LEON JAUDOIN-FROM
Liege, Belgium ..... M. JACQUES FOULON
Dusseldorf, Germany ..... DR. HERBERT GROSS

BUSINESS STAFF

Business Manager ..... J. W. ZUBER
Promotion Manager ..... S. F. MARINO
Circulation Manager ..... G. R. EBERSOLE
Market Research Mgr. ..... N. R. LABABOUCHE
Statistician ..... G. J. AUNER
Advertising Director ..... H. G. ROWLAND
Advertising Service Mgr. ..... DORIS ROBBINS
Production Manager ..... A. V. ANDERSON
Mail & List Service ..... AMY LOMBARDO
Reprints ..... C. B. NILES

Advertising Representatives

New York 17 ..... 60 East 42nd St.
K. A. ZOLLNER, GUY LABAW
Murray Hill 2-2581
Philadelphia ..... 200 Wynnewood Ave.
Wynnewood, Pa.
WM. J. VERSCHOOR
Midway 2-6512
Farmington, Conn. ..... 12 Farmstead Lane
CALVIN FISHER, JR.
Orchard 7-1756
Pittsburgh 19 ..... 2837 Koppers Bldg.
J. C. SULLIVAN
Atlantic 1-3211
Cleveland 13 ..... Penton Building
D. C. KIEFER, E. H. THOMAS
Main 1-8260
Cincinnati 30 ..... 5565 Beechmont Ave.
E. L. FRANKE—Parkway 3640
Detroit 26 ..... 1249 Washington Blvd.
C. A. TALLINGER, JR.—Woodward 3-3488
Chicago 11 ..... 520 North Michigan Ave.
L. C. PELOTT, W. L. POLAND
JOHN W. VAUGHAN
Whitehall 4-1234
Los Angeles 48—6262 Commodore Sloat Dr.
F. J. FULLER—Webster 1-6865
San Francisco 4 ..... 57 Post St.
F. J. FULLER, Robert W. Walker Co.
Sutter 1-5568
Griffin, Georgia ..... 331 South 12th St.
FRED J. ALLEN—Griffin 7854

BPA

NBP

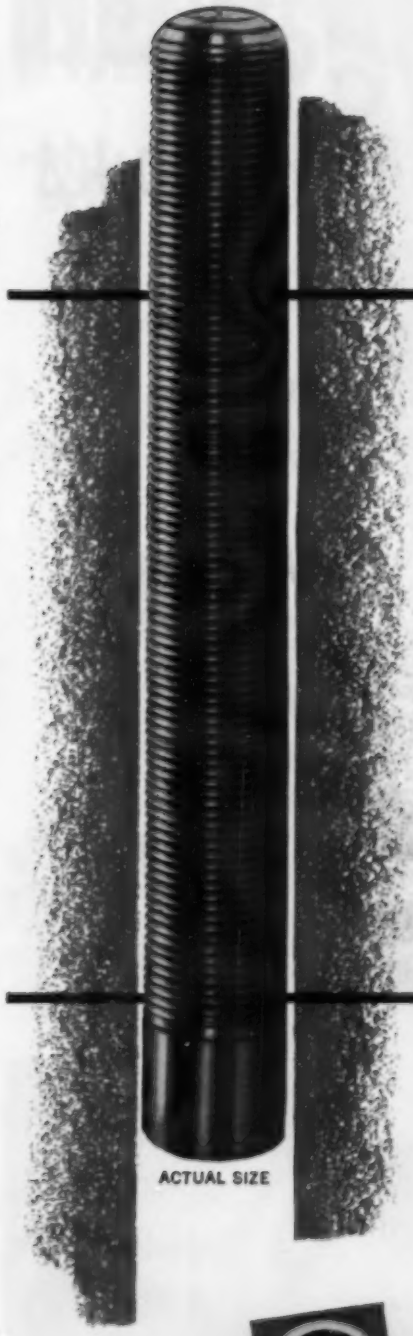
Published Every Monday by
THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio
MAin 1-8260

O. O. HAYS ..... *President and Treasurer*
R. C. JAENKE ..... *Executive Vice President*
F. G. STEINEBACH ..... *Vice President and Secretary*
F. O. RICE ..... *Vice President*
J. P. LIPKA ..... *Asst. Secy. and Asst. Treas.*

Also Publisher of
FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST, AUTOMATION

Member of Business Publications Audit of Circulation Inc., Society of Business Magazine Editors, and National Business Publications, Inc.

No. 8 in a Series



ACTUAL SIZE

when the odds don't have it...

Before putting the chips down it is well to realize that reliable machine performance is largely dependent on well balanced tooling. If it is a multiple spindle bar automatic, an even number of work spindles provides a better opportunity for balance than an odd number.

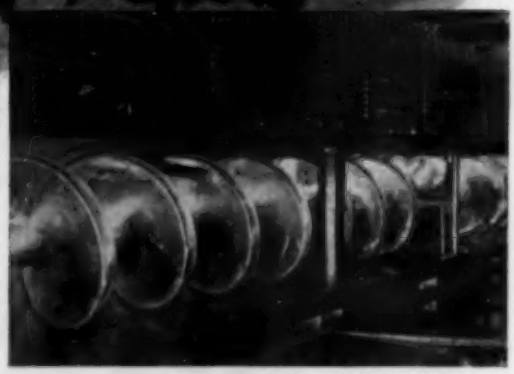
Odd or even, the work spindles are only one of many important considerations in the selection of an "automatic". Other factors also important to the individual machine user are suggested by the new Conomatic General Datalog. Copies are now available.

data for comparison

Part	**Levelling Screw**
Machine	**1⅛" Six Conomatic**
Tools	**100% Carbide Tipped**
Material	**B-1112**
Stock Size	**1" Round**
R. P. M.	**Work Spindle — 958** **Opposed Spindle — 677**
Time	**7.25 Seconds per Cycle** **3.6 Seconds per Piece**

Conomatic } CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.

BOILING WELDED proves



REPUBLIC ENDURO STAINLESS STEEL DOES A BIG JOB in this "Thermo-screw," a screw conveyor with wide uses in chemical and food-processing. Here Enduro transfers heat or cold through the hollow shaft while the screw is totally immersed in the material being processed. Heat or cold loss is minimized, compared with heating or cooling the outside of a vessel or using a static immersion unit.

REPUBLIC STEEL CORPORATION
3120 East 45th Street,
Cleveland 27, Ohio

Please send me more information on:

☐ Stainless Steel Tubing and Pipe ☐ Stainless Steel–Flat Rolled
☐ Electrunite Dekoron-Coated E.M.T. ☐ Republic Titanium

Name_____ Title_____

Company_____

Address_____

City_____ State_____

A-1000

STAINLESS STEEL TUBING IN ACID

the Weld is Corrosion Resistant!

Maybe you're one of the few people who hasn't fully accepted that idea up to now. Here's what we do to prove it.

We take a piece of standard Republic ELECTRUNITE Stainless Steel Tubing and put it into a 20 per cent hydrochloric acid solution. Then we let it boil.

When we take it out, the wall thickness has been reduced from .089 inches to .059 inches.

But the weld area is only reduced to .068 inches.

Proof: the weld area is not subject to preferential corrosion.

This is an accelerated lab test. We realize it's only one proof. But we also have on-the-job proof in chemical plants and refineries all over the country, where ELECTRUNITE welded stainless steel tubing is used. And processing corrosion is among the most severe.

The fact that we've been supplying electric resistance welded stainless steel tubing and pipe to process industries for the past twenty-five years means something for you. Find out exactly how much by calling your nearest Republic district sales office. Better yet, fill out and mail the coupon below.

REPUBLIC STEEL

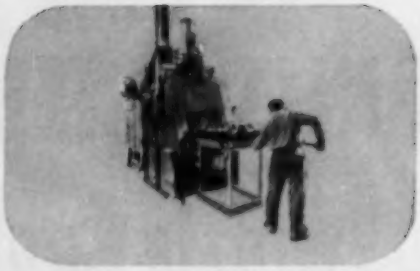
World's Widest Range of Standard Steels and Steel Products

IF YOU HAVE SEVERE CORROSIVE CONDITIONS like these at Kaiser Aluminum & Chemical Corp., Baton Rouge, La., Republic Dekoron-Coated Electrical Metallic Tubing or rigid steel conduit is the answer. This is galvanized steel with a coating of polyethylene, which gives electrical raceways double protection from end to end. Installation is easy. Connections between lengths are protected by vinyl or plastic tape.

YOUR PRODUCT CAN BE AS STRONG AS STEEL, yet weigh only 56 per cent as much. How? If it's made of Republic Titanium or Titanium Alloy. This high strength-to-weight metal, which is also unbelievably corrosion resistant, is now available in all commercial forms. And Republic has been working with it since 1948. We will tell you how and where to use it profitably. (Above: forged compressor rotor.)

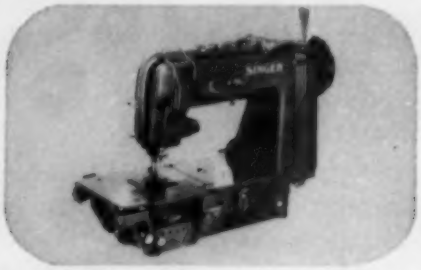
"10 little cyanide pots ..and then there were none"

1. Featuring Singer Sewing Machines and Lindberg Carbo-nitriding Furnaces.



2. Singer Manufacturing Co. bought a new Lindberg Carbo-nitriding furnace.

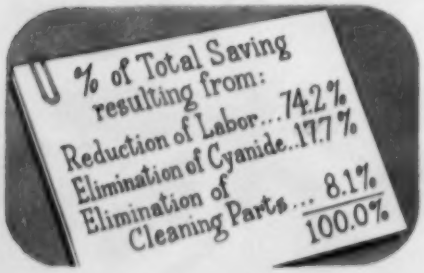
3. It replaced 10 liquid cyanide furnaces.



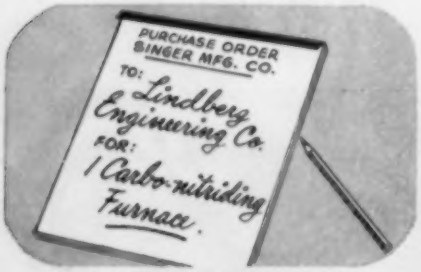
4. The new furnace heat treats parts for "industrial sewing machines"... used for stitching canvas, mattresses, overalls, etc.

5. In 12 months, the new Lindberg Carbo-nitriding furnace paid for itself in savings.

6. Mr. Lloyd R. Raymond, Supt. of heat treating at Bridgeport plant of Singer.


% of Total Saving resulting from:
Reduction of Labor... 74.2%
Elimination of Cyanide.. 17.7%
Elimination of Cleaning Parts... 8.1%
100.0%

7. . . . submitted this report to his top management.



8. . . . with this requisition for a second Lindberg Carbo-nitriding furnace (to double production of carbonitrided parts).

End of Story

LINDBERG FURNACES

LINDBERG ENGINEERING COMPANY

2441 W. Hubbard Street • Chicago 12, Illinois

ALL AT SEA?

. . . about machine tool replacement . . . the cost and profit factors involved . . . how best to finance the new equipment you need?

In other words . . .

TEEL

Is there such a thing as...

A PRACTICAL REPLACEMENT PROGRAM?

YES! – and Jones & Lamson can help you develop it

Industry unanimously endorses the idea of planned replacement of capital equipment. Nevertheless, most of America's machine tools are more than 10 years old, sadly inferior to today's profit-producing equipment. The idea is sound — but action is lacking.

Biggest reason for this paradox is financial. Until recently, replacement required a substantial outlay of capital. In many cases, needed capital was lacking; in others, the capital, though available, had many other calls upon it. Unrealistically low depreciation allowances on capital equipment served as an added deterrent to replacement.

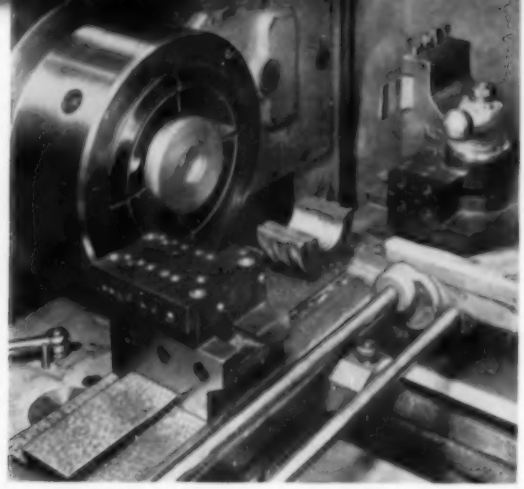
The picture has changed. Now, provisions of our new tax laws permit more equitable write-offs, and make replacement a more attractive proposition.

Jones & Lamson makes replacement even *more* feasible, by clearing away the traditional difficulties of financing with its unique Procurement Plans.

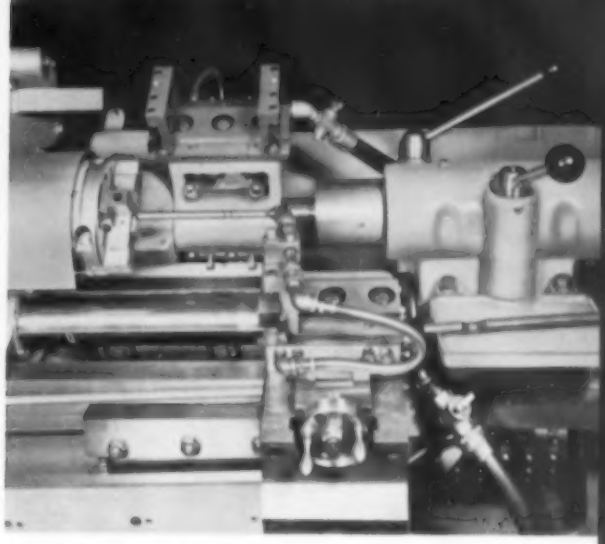
This, then, is what Jones & Lamson offers: modern machine tools that can greatly improve your production; *plus* your choice of several sound, low-cost (interest rates as low as 3¼%, add-on) methods of procuring these tools.

◀ **OBSOLETE** machine tools like these hamper industrial growth, keep production low, and costs high.

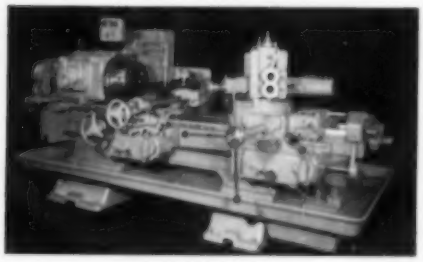
RESEARCH in machining methods, metallurgy, tool geometry, is carried on continually by J & L. Important findings have resulted in the incorporation of unique engineering features in J & L machines.



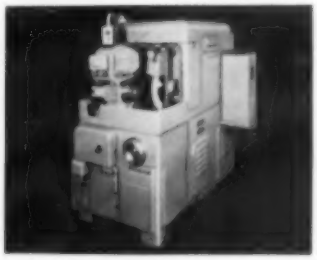
IMPROVED production on this difficult machining job was made possible by J & L engineers' close co-operation with the customer. Research testing, and incorporation of special features on a J & L turret lathe cut time-per-piece on this bottle neck-ring from 14 to 5½ min., increased production 120%!



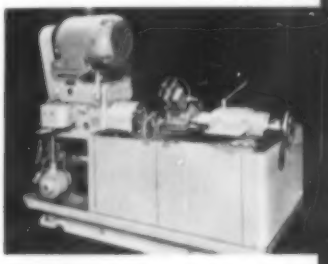
AUTOMATIC OPERATION. One Fay Automatic Lathe replaced eight engine lathes formerly used on this job — and substantially increased production of sewing machine crankshafts at the same time.



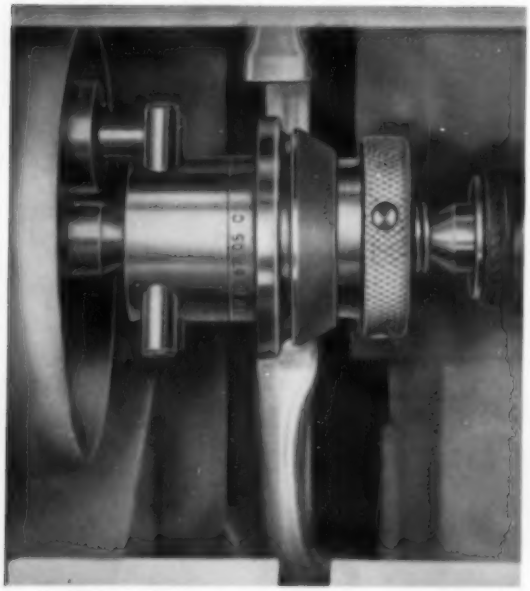
Universal Turret Lathes



Automatic Thread & Form Grinders



Fay Automatic Lathes



GRINDING. This J & L Model "E" Form Grinder, used in producing seaming rolls for the canning industry, completely eliminated a roughing operation, increased production by 100%.

JONES & LAMSON MACHINE COMPANY

517 Clinton St., Springfield, Vt., U. S. A.

Universal Turret Lathes • Fay Automatic Lathes • Automatic Thread & Form Grinders
Optical Comparators • Automatic Opening Threading Dies & Chasers
Automatic Double-End Milling & Centering Machines

Send today for complete details on J & L's machines, methods and Procurement Plans. Simply fill in the coupon below, clip it to your letterhead and mail. We'll do the rest.

JONES & LAMSON MACHINE COMPANY
517 Clinton St., Springfield, Vt., U. S. A.

GENTLEMEN: Please send me the J & L Machine Tool Replacement Information Kit.

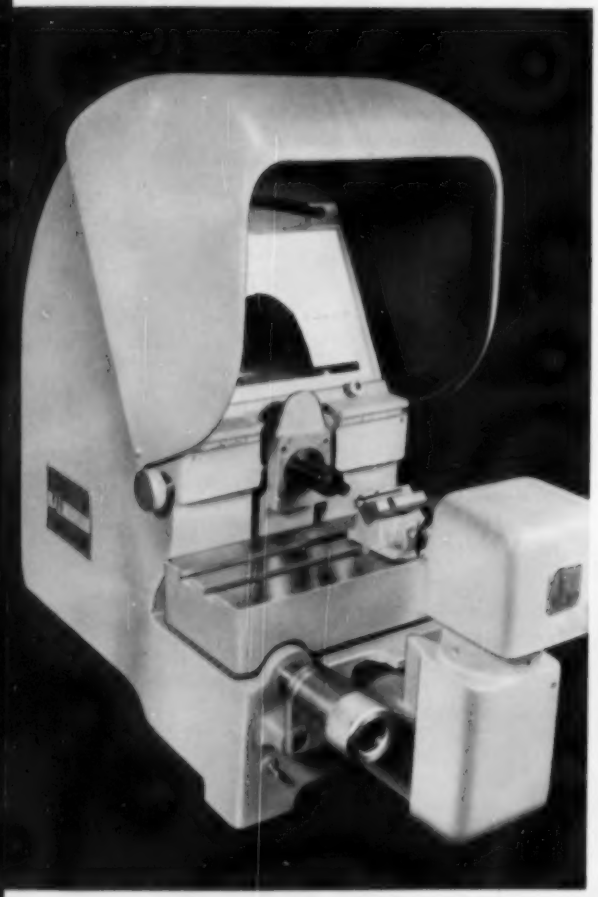
Name .....

Title .....

ACCURATE PRODUCTION INSPECTION AT LOW COST

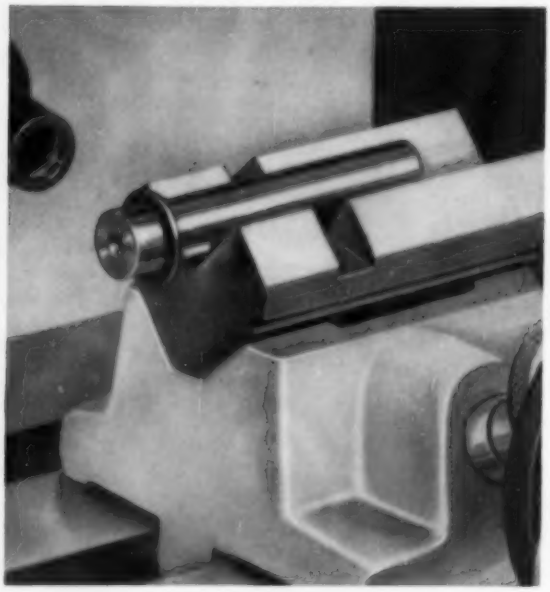
The Jones & Lamson BC-7 Optical Comparator

A versatile . . . economical . . . easy-to-operate bench gage



The inspection of "O" rings is a good example of the difficult jobs that are easily handled by the J & L BC-7 optical comparator. The rubber rings are held on a simple plug gage which duplicates their positioning in final assembly. The operator then merely looks at the chart on the viewing screen to check for thickness and amount of flash. The chart is a standard grid, laid out in .050″ squares which represent .001″ on the "O" ring at 50 magnifications.

There is *no* danger of distorting the piece as there would be in mechanical gaging. Only this one gage is used, because the optical comparator inspects in *all* planes.



By merely changing the fixture and chart, a great variety of totally different parts can be inspected accurately and economically.

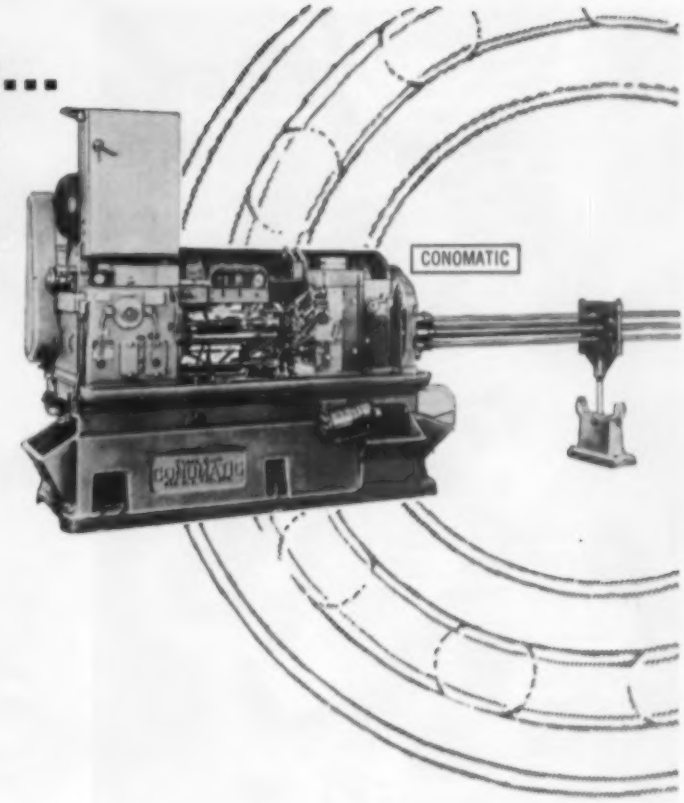
Machine Tool Craftsmen Since 1835

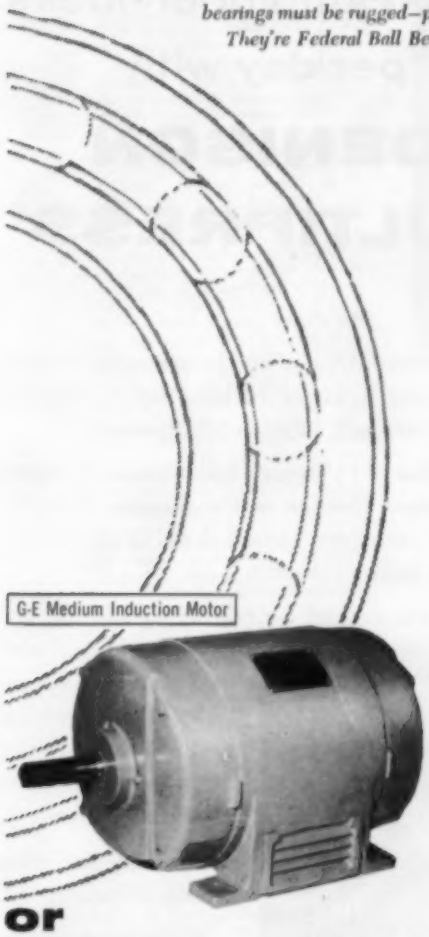
JONES & LAMSON MACHINE COMPANY

COMPARATOR DIVISION, 517 Clinton St., Springfield, Vermont, U. S. A.

to feed a tool...

Automatic feed transmissions on newest type Conomatic Six Spindle Bar Machines have to deliver a powerful, steady tool drive under heavy loads for precision carbide machining. Feed shaft bearings must be rugged—precise. They're Federal Ball Bearings.





or quiet a motor...

The smooth hum of today's precision-built motors whispers the efficiency of every part. Here, too, Federal Ball Bearings quietly perform their continuous, anti-friction assignment—whatever the size—whatever the type.

so much of industry *turns* on FEDERAL ball bearings

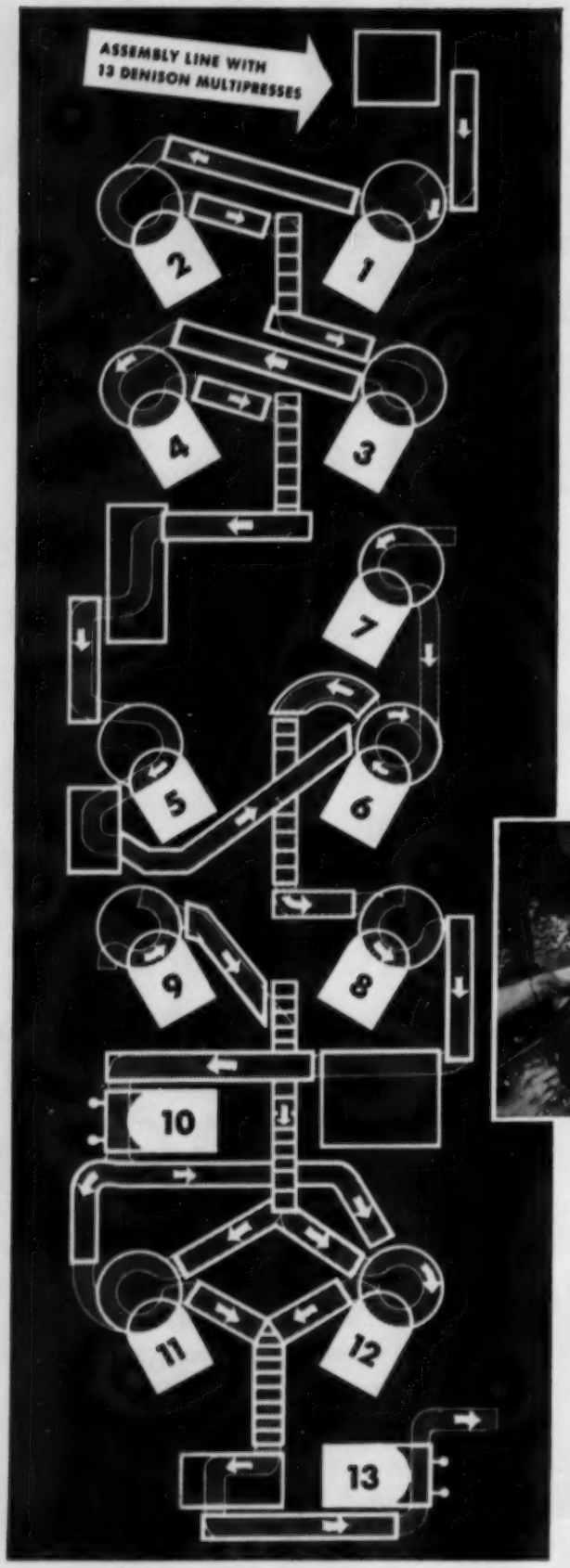
Machine tools—motors—or moving vans! At plant, home, machine shop! On the highway, on the farm—where there's anti-friction work to be done, you'll find Federal Ball Bearings quietly and efficiently on the job. Hundreds of types—12,000 sizes—produced by this 50-year-old manufacturer of ball bearings...exclusively.
When Federal Ball Bearings are a part of so many things you *use*, shouldn't they be a part of the things you *make*?

Just off the presses! *175 pages of ball bearing and engineering data*—FEDERAL'S NEW CATALOG! *Just drop us a line and we'll speed you your copy.*

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.

Federal BALL BEARINGS

One of America's Largest Ball Bearing Manufacturers



Assembles 13,000 auto door-locks per day with DENISON MULTIPRESS®

THIS COMPANY set out to assemble 10,000 auto door-locks per 16-hour day . . . beat its goal by 3000 with Denison Multipress.

With a line of 13 Denison hydraulic Multipresses, Reid Products Division of The Standard Products Company assembles 13,000 door-locks . . . 34 pieces per lock.

Parts are carried on conveyors and chutes. Operators load component parts on Denison Index Tables which position them under the hydraulic ram up to 70 times a minute.

Loading for staking of five-part sub-assembly

Assembly line takes up only 500 square feet.

If you have a problem in automatic operation. . . or any job that calls for controlled pressures up to 75 tons, bring it to Denison. Write to:

THE
DENISON ENGINEERING COMPANY
1180 Dublin Road • Columbus 16, Ohio

DENISON Hydr OIL ics

CALENDAR
OF MEETINGS

January 31-February 4, American Institute of Electrical Engineers: Winter general meeting, Statler hotel, New York. Institute address: 33 W. 39th St., New York 18. Secretary: N. S. Hibshman.

January 31-February 4, American Society for Testing Materials: Spring committee week, Netherland-Plaza hotel, Cincinnati. Society address: 1916 Race St., Philadelphia 3. Executive secretary: Robert J. Painter.

February 2, Cutting Tool Manufacturers Association: Annual meeting, Detroit Yacht Club, Detroit. Association address: 416 Penobscot Bldg., Detroit. Secretary: Martin J. Ewald.

February 6-11, American Society of Civil Engineers: Annual meeting, U. S. Grant hotel, San Diego, Calif. Society address: 33 W. 39th St., New York 18. Secretary: Col. Wm. N. Carey.

February 7-9, American Management Association: Marketing conference, Statler hotel, New York. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

February 8-9, American Welding Society and Armour Research Foundation: Midwest welding conference, Illinois Institute of Technology, Chicago. Information: Illinois Institute of Technology, 35 W. 33rd St., Chicago 16.

February 8-10, Society of the Plastics Industry Inc.: Annual reinforced plastics division conference, Hotel Statler, Los Angeles. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

February 10-12, National Tool & Die Manufacturers Association: Winter meeting, Ambassador hotel, Los Angeles. Association address: 907 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

February 10-17, Automotive Electric Association: Annual meeting, Edgewater Beach hotel, Chicago. Association address: 16223 Meyers Ave., Detroit 35. Secretary: S. W. Potter.

February 13-17, American Institute of Mining & Metallurgical Engineers Inc.: Annual meeting, Conrad Hilton hotel, Chicago. Institute address: 29 W. 39th St., New York 18. Secretary: E. H. Robie.

February 14-16, American Management Association: Personnel conference, Palmer House, Chicago. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

February 17-18, Drop Forging Association: Winter meeting, Statler hotel, New York. Association address: 605 Hanna Bldg., Cleveland 15. Secretary: R. M. Seabury.

February 25-March 1, American Supply & Machinery Manufacturers' Association Inc.: Regional meeting, Warwick hotel, Philadelphia. Information: Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15.

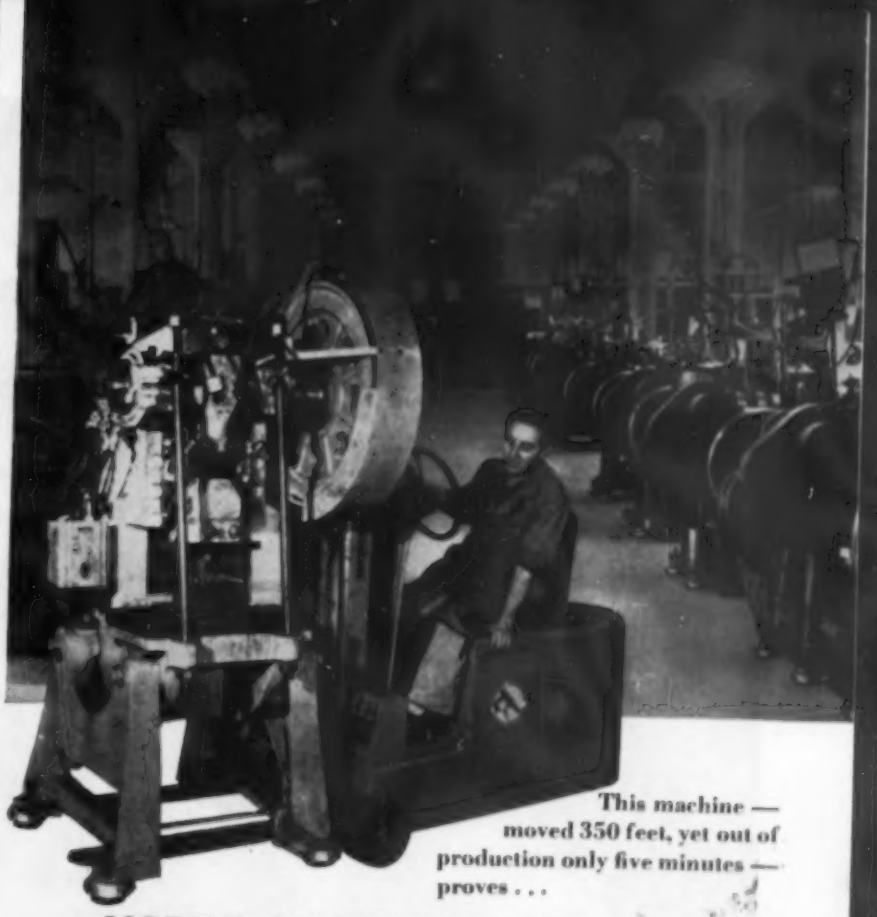
February 28-March 4, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy: Hotel William Penn, Pittsburgh. Information: L. D. Frederickson Jr., Aluminum Research Laboratories, P. O. Box 772, New Kensington, Pa.

March 1-2, American Society of Mechanical Engineers: International congress on air pollution, Hotel Statler, New York. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

March 1-3, Society of Automotive Engineers Inc.: Passenger car, body and materials meeting, Sheraton-Cadillac hotel, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

March 7-11, National Association of Corrosion Engineers: Annual meeting and exhibit, Palmer House, Chicago. Association address: 1061 M & M Bldg., Houston 2. Secretary: A. B. Campbell.

March 10-11, Porcelain Enamel Institute: Pacific coast conference, Biltmore hotel, Los Angeles. Institute address: 1346 Connecticut Ave., N.W., Washington. Secretary: John C. Oliver.



This machine — moved 350 feet, yet out of production only five minutes — proves . . .

MOBILE MACHINERY CUTS COSTS

The leveling BARRYMOUNT® lets you install machines anywhere, without fastening them to the floor. This means you gain machine mobility. Your product costs can be cut because mobile machinery gives you flexible production layouts. Machine maintenance and reject costs are cut because damaging external shocks are isolated. Installation costs are cut because requirements for expensive foundations are eliminated — no lag bolts to set or shims to drive, yet machines will not walk.

1 No lagging or cementing because the resilient mount isolates vibration and shock in all directions — machines won't walk.

2 Leveling is simple and fast — just turn the cap screw and tighten the lock nut — no shimming is necessary.

Write today for your free copy of LOOK — NO LAGGING and learn how you can save money with BARRYMOUNT® isolators.

NOW SOLD THROUGH INDUSTRIAL DISTRIBUTORS

THE BARRY CORP.

1926 PLEASANT STREET
WATERTOWN 72, MASS.

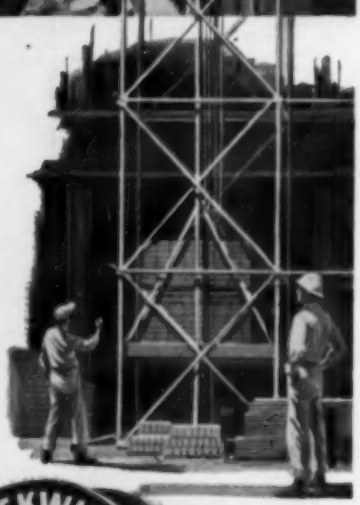
SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

MUSCLES OF STEEL
took the load off his back

Sweat and a strong back just aren't enough when it comes to meeting the stepped-up demands of modern construction work. Today's contractors and builders call on *muscles of steel*—sturdy wire rope—to lift and carry their heavy loads.

Supplying these *muscles of steel* to the giant that is American industry is our big job here at Wickwire—a job that has commanded our vigilant care and painstaking quality control for over half a century.

In the mines and the quarries. In the logging camps and the oil fields. On construction and highway projects. With the fishing fleets and in materials handling. Wherever wire rope is used, Wickwire Rope has earned an outstanding reputation for efficiency, utmost safety, long economical service and unfailing reliability.



every industry benefits from wire rope

WICKWIRE ROPE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

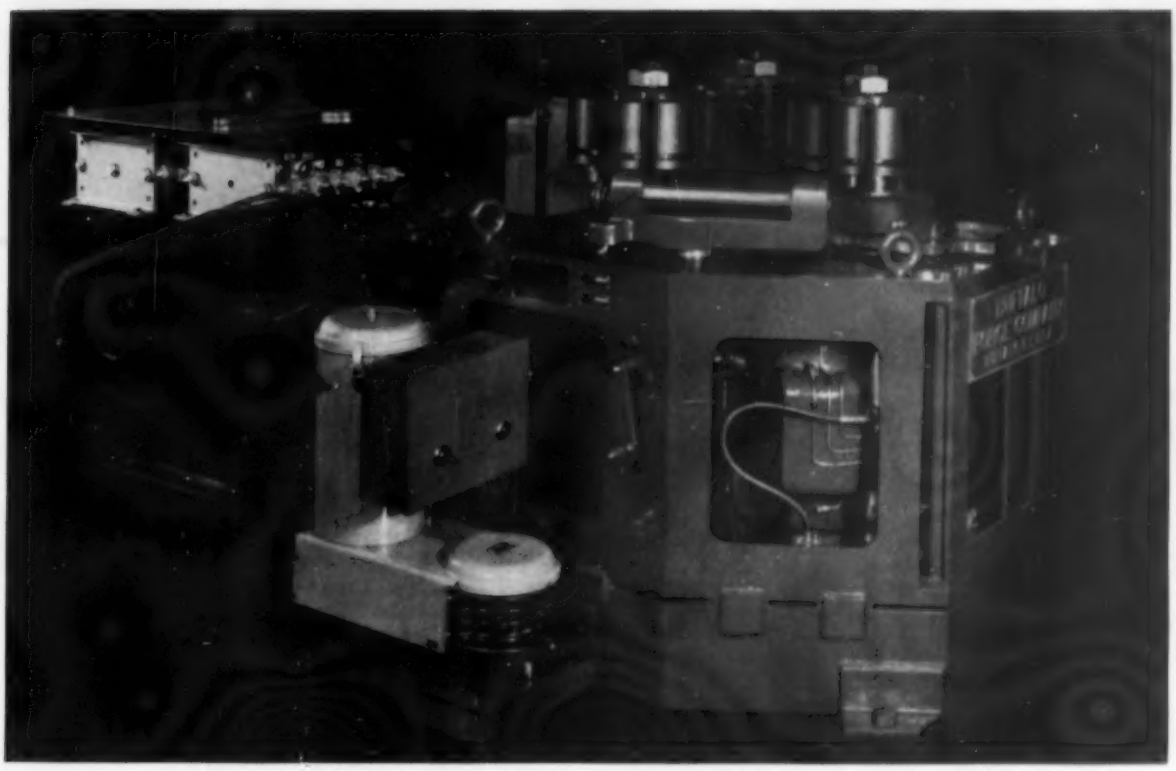
2487

YOU'RE BUYING

OUTPUT

WHEN YOU BUY

"BUFFALO" BENDING ROLLS



- Production speed in bending arcs, circles, spirals
- Handle angles, beams, channels, flats, rounds, squares, pipe
- Wide variety of sizes to suit your operations
- Little experience needed to operate
- Your cheapest method of bending structurals

For complete information on "Buffalo" Bending Rolls (OA Aircraft Type, Pinch Type, Horizontal and Vertical). Write for Bulletins 352 and 3344.

"Buffalo"

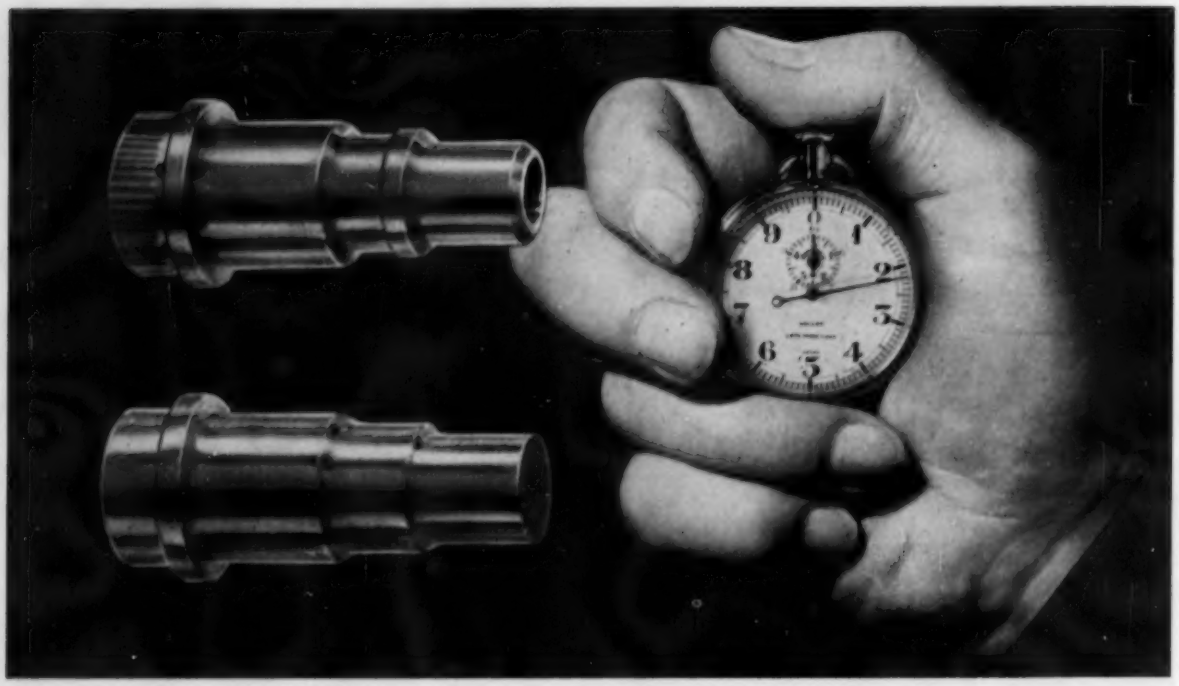
BUFFALO FORGE COMPANY

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING

OUTLOOK ME
METALWORKI
OUTLOOK ME



Finished 50% faster

Using Ledloy from Ryerson

By the time the B-1113 piece was finished, you'd be halfway through a second Ledloy piece. Such greater speeds and feeds are possible with Ledloy because Ledloy contains a *built-in lubricant* which substantially reduces the friction between the steel and the cutting tool.

That built-in lubricant is *lead*—so finely dispersed through this free-machining, open-hearth steel that you can't see it with a microscope. The addition of this small percentage (.15-.35) of lead has no effect on the mechanical properties of the steel EXCEPT to greatly increase machinability.

Ryerson Ledloy machines up to 50% faster than B-1113 . . . tool life is extended as much as 200% . . . and net savings of 25% and more are effected. And Ledloy machines to an unusually clean, smooth finish—case hardens effectively —and bends, crimps, swedges or rivets easily.

Ask your Ryerson representative for the facts about Ledloy or write us direct for engineering data. Ryerson was the first to stock Ledloy and today your nearby Ryerson plant carries the world's largest stocks of Ledloy rounds, squares and hexagons in a wide range of sizes for immediate shipment when you call.

PRINCIPAL PRODUCTS

CARBON STEEL BARS — Hot rolled & cold finished

ALLOYS—Hot rolled, cold finished, heat treated

STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

TUBING—Seamless & welded, mechanical & boiler tubes

STRUCTURALS — Channels, angles, beams, etc.

PLATES—Many types including Inland 4-Way Safety Plate

SHEETS—Hot & cold rolled, many types & coatings

MACHINERY & TOOLS—For metal fabrication

RYERSON CERTIFIED STEELS

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND

DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Preliminary Program

Watch for this in United Auto Worker locals as the time approaches for formal negotiations on the guaranteed annual wage late in March: Brief strikes as a softening-up process (Ford employees have already been doing this); a flurry of strike-authorization votes (some GM locals have already gone through the formality); and insistence upon short-term or interim contracts for smaller auto suppliers whose agreements expire before next summer (malleable castings shops and others report their locals want to be able to demand GAW if it's granted by the big assemblers).

Coming: Antitrust Report

Look for an administration report on antitrust laws about Feb. 15. A committee headed by the attorney general is considering all angles of the subject, including economics and its effect on the law. Studied will be such knotty competitive situations as that in autos. Last year GM produced 52.2 per cent of all U.S. cars, Ford 30.6 per cent, Chrysler 13.1 per cent, Studebaker-Packard 2.1 per cent, Hudson-Nash 1.7 per cent and Kaiser-Willys 0.3 per cent.

New Look at Walsh-Healey

Pressure is mounting to modify the 19-year-old Walsh-Healey Public Contracts Act. It permits the U.S. to set minimum wages for companies having government contracts. Actually, the effect is to set minimums for a whole industry because of competition for skilled labor. What's more, the minimums are always higher than the present 75-cent floor and usually above even the proposed 90-cent level. The Walsh-Healey minimum for small arms ammunition makers, for example, is $1.05 an hour.

Good Year for Industrial Building

Industrial contractors believe 1955 will be "another good year," better than 1954 but not as good as the record-breaking years immediately following the start of the Korean war. The National Constructors Association, whose members design and build chemical plants, steel mills, petroleum refineries and power plants primarily, says power plant work is a "bright spot" and will continue to be good for at least ten years.

More Business Aircraft

Within the next ten years some 15,000 companies may own 40,000 to 50,000 airplanes. The National Business Aircraft Association Inc. says business aircraft are a tool needed to supplement services of airlines. There are about 6000 airports in the U.S. but only 600 are served by airlines. NBAA estimates that some 6000 companies today own and operate 12,000 aircraft, an increase of more than 300 per cent since 1946.

Steel Profit Ratio Up

Steel companies are getting more for their sales dollar, even though 1954 sales were below 1953 levels. U.S. Steel Corp. had a net return of 6 cents

per sales dollar last year, compared to 5.8 cents in 1953. Republic Steel Corp. earned 6.2 cents, compared to 4.9 in 1953. Inland Steel Co. had a net profit of 7.6 cents last year, 5.8 cents in 1953. U.S. Steel's 1954 return was so promising that it's boosting quarterly common stock dividends from 75 cents to $1. It also plans to split its common stock. Another sign of U.S. Steel's confidence in the future: It will spend $360 million on expansion and modernization in 1955, compared to $227 million in 1954.

Railroads To Build Trailers?

Railroads are considering building semitrailers in their boxcar plants. The idea would help railroads in two ways: It would keep some of their idle carbuilding facilities busy; it would give them semitrailers for piggyback operations. The trailers would be for railroad use only and would employ aluminum in superstructure and wheels.

The Influence of Steak

Through a man's stomach is also a way to good personnel relations, says Calvin Brown, president of Set Screw & Mfg. Co., Bartlett, Ill. Each Wednesday noon the company has a steak dinner for its executives, supervisors and visitors. Each week two shop employees are also invited. Visitors are introduced, as well as the shop men, and the atmosphere is strictly informal. "It has done wonders," Mr. Brown reports. "For the first few weeks the shop people were ill at ease. Now they look forward to the luncheons." Employees are invited alphabetically.

Straws in the Wind

Studebaker-Packard Corp. is still losing money on every Studebaker built, but the Studebaker UAW local has voted to authorize a strike over disputed production schedules . . . Local 453 of the CIO electrical workers says that terms offered by Otis Elevator Co. to stay in Yonkers, N. Y., and Harrison, N. J., include a revision in job standards, elimination of the day-work bonus and a change in seniority provisions to give the company latitude in transferring employees and operations to and from the Yonkers and Harrison plants and the New York office . . . A factory worker with three dependents took home $68.63 a week in December, up 45 cents from November, the previous peak . . . U.S. Steel hopes to sell substantial tonnages of Venezuelan ore abroad . . . More than $3 billion was spent on industrial research in 1954.

This Week in Metalworking

Machine tool shipments may hit $910 million in 1955, up slightly from $892 million in 1954 (p. 37) . . . Technical developments are coming that may make more low-grade domestic manganese usable as an alloying and processing element in steelmaking (p. 39) . . . Machinery & Allied Products Institute urges the U.S. to ease its demands for technical information from government contractors (p. 40) . . . Despite a moderate upturn in railroad revenues, don't expect much improvement this year in railroad buying, particularly for steel (p. 41) . . . Rail-Trailer Co. has contracted with truckers and the Pennsylvania Railroad as a piggyback specialist (p. 42) . . . Automation holds promise for more business in 1955 than in 1954 for motor control manufacturers (p. 48).

Efficiency in Cutting-off is Important

Practically all machining operations start with pieces cut-off from bars or billets. Hence, inefficiency, or lack of capacity, in the cut-off department can hold up or stagnate the entire plant.

THE MARVEL NO. 6A AND 9A HEAVY DUTY HACK SAWING MACHINES

A. Are all-ball-bearing and provide a quick return; therefore they run FASTER than others on the same work.

B. Can apply as much as 1200 pounds feed pressure—two to ten times as much as other hack saws and band saws.

C. Are fully automatic, requiring no more operator attention than an automatic screw machine; and set-up for any bar size and cut-off length is extremely simple.

D. Use a non-breakable high speed hack saw blade — the type of saw blade that produces the greatest number of square inches of metal cut per dollar of blade cost—two to ten times (or more) as much as any band saw.

E. Because of their exceptional sturdiness, ball bearing reciprocating frame, ability to tension the blade "truly taut", their accuracy is dependable.

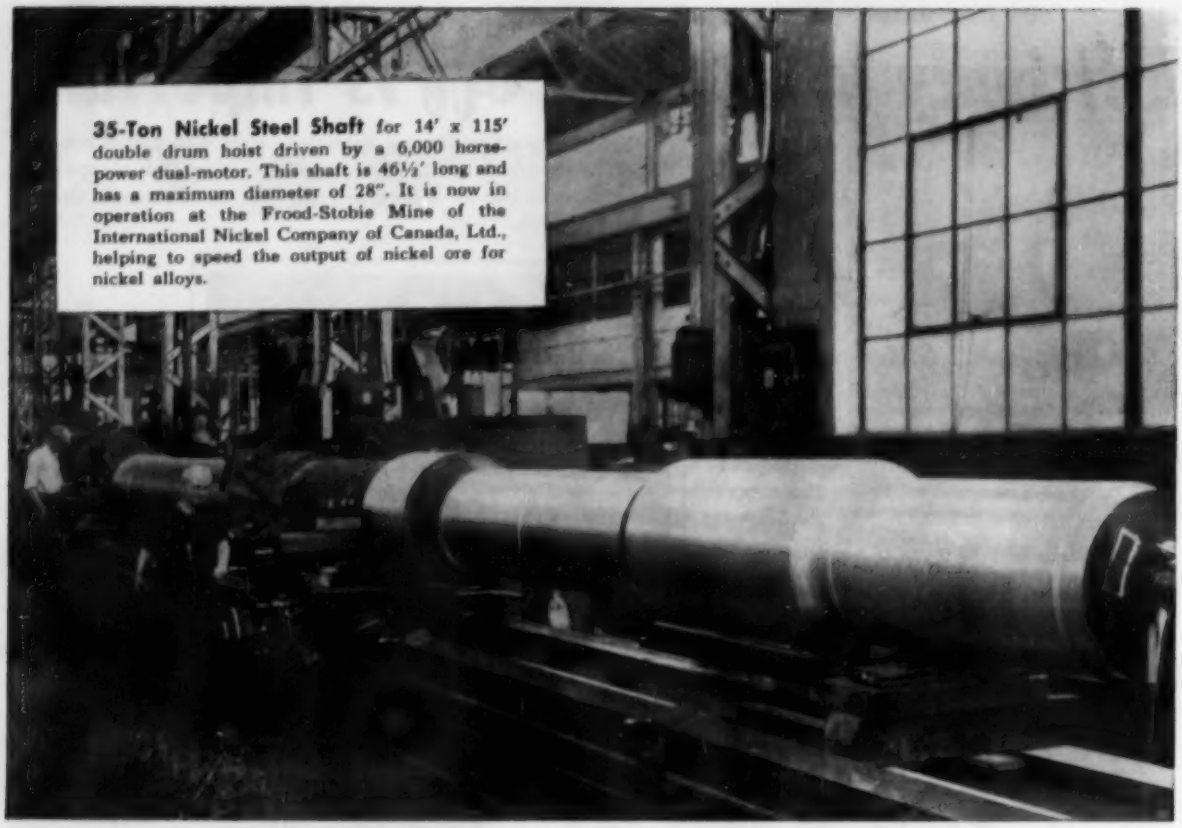
If you are not using modern, improved MARVEL NO. 6A and 9A production hack saws, call the local MARVEL Field Engineer and get his production and cost estimates on your work—to compare with your experience records.

The composite MARVEL High-Speed-Edge Hack Saw Blade—cuts **any** machinable material efficiently. There is no time lost changing blades for different types of steel; no time lost replacing shattered blades, because MARVEL High-Speed-Edge Hack Saw Blades are positively **unbreakable.** These superior blades have the finest high speed steel cutting edge welded to a strong alloy steel body. They will stand-up under the highest speeds and heaviest feeds attainable on any make hack saw. Can be safely tensioned tauter than any other blade—cut-off not only straight but also square and with less stock loss.

Write for catalog C-55—showing and describing eleven different series of Metal-Cutting Sawing Machines and MARVEL-High-Speed-Edge Hack Saw Blades and Hole Saws.

MARVEL Metal Cutting SAWS
Better Machines-Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.



35-Ton Nickel Steel Shaft for 14' x 115' double drum hoist driven by a 6,000 horsepower dual-motor. This shaft is 46½' long and has a maximum diameter of 28". It is now in operation at the Frood-Stobie Mine of the International Nickel Company of Canada, Ltd., helping to speed the output of nickel ore for nickel alloys.

How nickel strengthened the shaft for Canada's highest powered mine hoist

IN LARGE FORGINGS such as this giant shaft, high tensile and elastic properties do not come easily.

Liquid quenching of heavy forgings is usually impractical. Even when the shape is such that this treatment may be safely applied, the section sizes involved often restrict cooling to rates which render the quench ineffective.

Increased strength, hardness, toughness and other mechanical properties in a large forging depend to a great extent upon selection of alloy content.

Accordingly, to attain maximum strength and toughness in the shaft of Canada's highest powered mine hoist, at our own Frood-Stobie mine, we specified a shaft forged of 3½% nickel steel . . .

Because nickel, either alone or in combination with other alloying elements, provides a number of advantages.

For one thing, it has a strengthening effect on ferrite . . . independent of carbon content or heat treatment of the steel.

For another, it lowers the rate and temperature of the upper transformation, thus inducing better response to the necessarily milder heat treatments used. And it reduces grain growth.

Whenever you face a metal problem, let us help you make a selection that will meet your particular fabricating and service requirements. Send us details of your applications, for our suggestions.

INCO
TRADE MARK

Double Drum Hoist for the Frood-Stobie Mine, during course of shop erection by the builder, The John Bertram & Sons Co., Ltd., Dundas, Ontario. Spiders that support the steel shell of the hoisting drum were cast in an iron containing 1½% nickel . . . to assure adequate strength in the 74,600-pound drum-spider assembly. This hoist, operated by push button control from a station far underground, can lift skips containing 15 tons of nickel-copper ore, at an average rate of 14,000 tons daily.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

Preventive Maintenance for Men

We have been reading the obituary columns. We are appalled by the large number of relatively young metalworking executives—men in their forties and fifties—whose deaths are chronicled. We cannot help wondering whether many of the losses could have been avoided if the preventive maintenance care devoted to plant and equipment had been applied to them.

The stresses and strains that face management men in modern industry tend to shorten their life span. One large metalworking company finds the average age of death for its top and middle management people is fifty-five years. The life span for white males in all occupations is sixty-six.

The chief cause of death among metalworking executives, accounting for nearly fifty per cent, is heart disease. Cerebral hemorrhages and malignancies are the next principal causes.

Medical men believe many such deaths could be prevented if the executive were made aware of his condition, underwent treatment and adapted his way of living to his state of health.

The situation has caused hundreds of progressively managed metalworking companies to institute health programs for executives. But thousands still leave health problems to the individual.

Too often the individual is too busy or too preoccupied with business problems to take time out for a periodic physical examination. Sometimes he regards himself as a unique physical specimen who is immune to normal illness and disease. He may regard the seeking a physical exam as a sign of weakness. Maybe he is afraid of the results. He needs a nudge.

Executive health programs are low in cost. They are large in benefits. They may save an expensively trained executive for additional years of service by enabling early remedial treatment for conditions revealed in a periodic examination. They may erase worry by giving the man a clean bill.

As these programs improve executive health, they result in better management by healthier persons and better personnel relations resulting from better management.

Walter J. Campbell

MANAGING EDITOR

DATA SHEET NO. 1

INLAND

facts about

LEDLOY*

*Patented Tradename of Inland Steel Company, leaders in development of Leaded Steels.

ONLY LEDLOY STEELS PROVIDE 25-50% FASTER MACHINABILITY WITHOUT AFFECTING OPEN HEARTH MECHANICAL AND METALLURGICAL PROPERTIES!

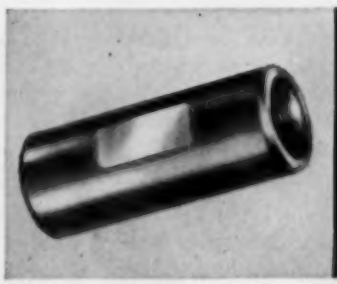
Manufacturers of screw machine products and producers of machined forgings report phenomenal increases in production and improved product appearance with the use of LEDLOY.

Screw machine operators and producers of machined forgings, all over the world, are setting new production records with Ledloy, both in the hot rolled and cold drawn forms.

The addition of lead to steel, by Inland's patented process, lowers the steel's friction component, actually lubricating the cutting tool during machining, both where the cutting edge contacts the work and where the chip bears against the tool face. Also, because of the fine lead particles throughout, Ledloy chips break up into more desirable shorter lengths which quickly fall clear of the tool, again reducing friction during cutting. Ledloy's lubricating and better-chip-forming qualities make it the fastest machining steel in the world. These qualities reduce the generation of heat, minimize the power required to cut and deform the chip and allow higher machining speeds with a correspondingly large number of parts per hour.

Yet, LEDLOY does not alter the inherent open hearth steel qualities!

Unlike sulphur and phosphorous additions, the adding of lead to steel does not affect such desirable open hearth qualities as ductility, impact values, transverse strength, cross sectional soundness and heat treating properties. This means that both manufacturers of screw machine products and producers of machined forgings, if they use Ledloy, can realize phenomenal increases in machinability and still retain all the desirable mechanical and metallurgical qualities of open hearth steel.



Machining this coupling from cold drawn Ledloy Grade A resulted in a 50% increase in production. Tapping output doubled; taps lasted 35% longer.

A switch to hot rolled Ledloy Grade A in these forged fittings permitted a 27% increase in machinability.

If your product requires machining, it will pay you to get all the facts on Inland Ledloy. Ask your cold-drawer about it today, or write Inland Steel Company for an interesting new booklet, "Properties of Inland Ledloy Steels."

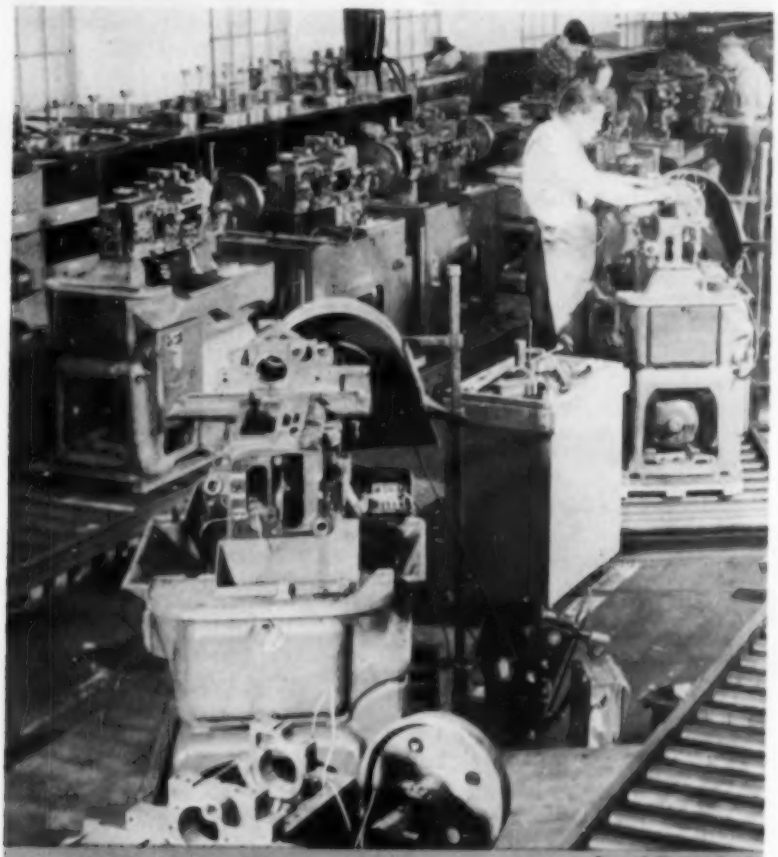
world's most machinable steel!

LEDLOY

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Louis • Davenport • Kansas City • St. Louis • Indianapolis • Detroit • New York



Brown & Sharpe Mfg. Co.

1955	$910 million*	1952	$1.1 billion
1954	$892 million	1951	$632 million
1953	$1.2 billion	1950	$316 million

*Estimated by STEEL. Other figures NMTBA.

Machine Tool Shipments . . . On the Rise in 1955

MACHINE TOOL SALES promise to be at least as high or higher this year than last.

New orders about equaled shipments in December for the first time since August, 1952. Early reports indicated January's new orders were about equal to December's for many, but not all, builders. "One of the big reasons we think we'll do better than last year," said one tool builder, "is that there's an air of confidence among our prospects now that wasn't there last year at this time."

Spotty Demand—Tell Berna, executive director, National Machine Tool Builders Association, says: "The trend is toward more orders though it's spotty. This year may well be up from 1954."

Such sales would mean machine tool builders will be fairly happy with sales again this year. It also will show industry as a whole has a healthy confidence in its own future.

No Gimmicks — Tool builders have been playing heavily on the theme that modern machine tools can help manufacturers lower their production costs. Replacement sales do, in fact, now represent the backbone of potential civilian commercial sales for most builders.

So $910 million in machine tool shipments in 1955 will mean industry is buying the idea of "modernizing capital equipment to stay competitive."

Good Lick—The frosting on the cake for tool builders in 1955 is the $140 million already appropriated for defense tooling—$100 million for tools for the Air Force, Army and Navy and $40 million for elephant tools.

Shipments of machine tools will closely reflect new orders this year. The dollar volume of new orders has been less than the value of shipments for the past two and a half years. Thus, the tool builders have been reducing their backlogs until today they're about three months for the industry as a whole. That's low; some layoffs in industry have come as result.

How To Do It—New orders in 1954 amounted to $560.5 million, compared with $861.8 million in 1953. To support the $910 million in tool shipments in 1955, tool builders will have to pick up about $350 million more new orders than last year. Those defense orders of $140 million will leave about $210 million to be gotten elsewhere.

That's where the confidence of business and the question of how well capital equipment producers have sold their story comes in.

Instruments Outlook Good

Annual investment rate of $4 billion in research is solid foundation backing up scientific apparatus makers' high optimism for 1955 sales.

Based on an 11-month comparison with 1953, data released by the Scientific Apparatus Makers Association shows that the only drop sustained in 1954 was in industrial instruments, which fell 12.5 per cent from their 1953 level. This backslide is due to slowing

demand for electronic testing instruments, says the association.

Continuing emphasis on automation, increasing number of smaller companies establishing quality control programs and more reliance on research as the businessman's insurance in highly competitive markets are further indications of good times to come. The association reports just one major problem: Lowered tariffs, with consequent increase of imports.

Aircraft Industry Spending Up

Costs of subcontracting, materials, fuel and electricity to the U. S. aircraft industry during 1954 were about $4 billion, reports the Aircraft Industries Association of America.

Aircraft manufacturing companies also paid about $3.54 billion to their 800,000 direct employees during the same period. Purchases accounted for about 47 cents of every sales dollar and went to companies in almost every state in the union, says the report. Excluding pilotless aircraft, the industry is now producing 91 different types of planes.

Rail Freight To Cost Less

New Interstate Commerce Commission interpretation of the Terminal Services Act will mean lower-cost freight service to industry.

Petitioned by both railroads and the National Industrial Traffic League, the commission has agreed to liberalize its rulings relating to charges which it had declared must be made for switching and delivery over and above standard line-haul rates.

The new interpretation comes after a 30-year battle. It is in great part prompted by the commission's recognition of the competitive advantage which its former rulings gave motor carriers. No "delay-charge" need henceforth be made for the following services: Moving partially handled cars for placing or removing other cars; weighing; sorting cars on private or on carrier's tracks; operations performed for a separate charge made according to an agreed tariff; delay caused by a common carrier by rail on industry tracks.

Industrial Furnaces: 10-15% More in '55

Manufacturers are conservatively optimistic at IHEA's meeting in Detroit

OPTIMISM predominated at the meeting of the Industrial Heating Equipment Association in Detroit last week. Heating equipment manufacturers look for a good year in 1955.

Few producers are expecting more than a 10 to 15 per cent pickup over 1954, but they will be satisfied if this rise materializes. Last year's business dropped an estimated 20 to 25 per cent below 1953's.

Cause to Cheer—It was a cheerier meeting than last May's. Furnace makers came to this one with more orders in sight.

Further buoyancy was added by the fact that heat treaters expect manufacturers to expand and modernize their facilities to meet competitive conditions. Another important factor is that industry is doing more heat treating, in relation to other metalworking activities, than was the case a few years ago. Automation is also lending impetus as heat treating equipment can now be put into the production line.

New Officers — Horace Drever, president, Drever Co., Philadelphia, succeeds L. H. Gillette, manager of industrial heating sales, Westinghouse Electric Corp., as president. The new vice president and director is Elton E. Staples, executive vice president, Hevi Duty Electric Co., Milwaukee. Treasurer is R. E. Whittaker, secretary, Swindell-Dressler Corp., Pittsburgh. Other new directors are: W. H. Holcroft, executive vice president, Holcroft & Co., Detroit; W. E. Benninghoff, vice president, Ohio Crankshaft Co., Cleveland.

Horace Drever, new president, Industrial Heating Equipment Association

Steel Plate Outlook Brightens

Business looks good to steel plate fabricators this year. At their 22nd annual meeting in Chicago, representative leaders thought that in view of projected government programs, supplies of heavy and wide plates and wide flange beams might well become tight by midyear.

H. D. Skyrm, vice president, General American Transportation Corp., was elected president of the Steel Plate Fabricators Association. E. E. Michaels, vice president and manager of operations, Chicago Bridge & Iron Co., was named vice president. Other officers include Williams S. Wheeler of Pennsylvania Engineering Corp., treasurer and J. Dwight Evans, executive director and secretary.

New Fast Tax Write-off Grants

Certificates of necessity for accelerated tax amortization for 44 new or expanded facilities were issued by the Office of Defense Mobilization between Dec. 30, 1954, and Jan. 12, 1955. More than $55 million was involved.

The main purpose of the amortization program is to expand private industry's productive capacity to meet mobilization goals, and the latest grants bring total allowances up to $29.7 billion for more than 19,000 facilities. Ten of the new grants were made to railroads and railroad equipment makers, 12 were made for petroleum storage, five for electronic and other instruments and three for research and development. Other categories included electric power transmission, military aircraft, titanium metal ingots, steel products and ordnance material. Westinghouse Electric Corp. was granted $7.7 million for research.

Pittsburgh Steel Co.

Research on slag, other sources, shows . . .

More Domestic Manganese Coming

STEEL producers can look forward to more domestic supplies of manganese. A Korean-spurred General Services Administration program to reduce the country's dependence on foreign sources for metallurgical-grade manganese is beginning to bear fruit.

Before World War II, Russia was the chief source for these ores. However, when trade between the U. S. and Russia diminished, America turned to Brazil, the African Gold Coast, India, South Africa, Mexico and South America for its supply. While those sources are fairly satisfactory, the government feels that it's imperative to have an available domestic supply in case of emergency. The search is on for ways to convert low-grade domestic ores to a usable product as an alloying and processing element, principally in steelmaking.

Objective — The GSA progress report, prepared by the Emergency Procurement Service, recommends the continuation of the program for at least another 18 months. As it started when we were at war, the urgency of the manganese situation was such that low recoveries and high costs could be tolerated. Now the urgency has diminished, and the experimental work being carried out through private contractors has the primary objective of finding processes for treating the various types of ores by the most practical and economical means.

In the course of the investigation, EPS has considered nearly a score of different new or unproven processes for extracting manganese from slags and various types of submetallurgical ores. A half dozen of these processes are promising enough to justify financial assistance by the government.

Actual research and testing work is being done on flotation and nodulizing, gravity and sink-float methods, pyrometallurgy, blast furnace reduction, and combined roasting and leaching.

Sources—All of the studies are aimed primarily at the three largest potential sources of domestic manganese: Open hearth slags; Aroostook county ores, Maine; and the manganese-bearing iron ore in the Cuyuna range, Minn.

EPS is also giving attention to the possibilities of treating ores from some of the lesser sources such as: Government stockpiles of submetallurgical ores; Artillery peak, Arizona; the Virginia-Tennessee-Alabama region; and the Arkansas region. With government help, plants for extracting manganese from ore have already been established and are now in operation at Henderson, Three Kids and Pioche, Nev.

Solution — When all the data from different pilot plants has been obtained, comparisons of different processes or combinations of processes should bring about the much sought-after results. The development work will probably require an additional 18 to 20 months.

Iron Powder Shipments Rise

Increased use of iron powder in the U. S. during 1954 is reported by the Metal Powder Association. Despite a lower level of business, iron powder shipments by domestic producers were 15.7 million lb in 1954 as compared with 12.5 million lb in 1953. Imports, largely from Sweden, totaled 19.7 million lb in 1954, 13.9 million lb in 1953.

Shipments of grain copper powder followed the general business pattern by showing a moderate decline. During the past year 19.3 million lb of copper powder were shipped domestically as compared with 23.0 lb in 1953.

U.S. Use of Technical Data Brews Storm

Capital equipment manufacturers have seen the proposed revisions of Part 2, Section IX, Armed Services Procurement Regulation, and are firing counterproposals

THE PROBLEM

A MILITARY procurement officer passed the engineering know-how of one contractor to competing producers as a means for obtaining a short-term pricing advantage.

That case, reported to Machinery & Allied Products Institute, is not uncommon. Even more common is to threaten such action to obtain some advantage from the contractor in the final agreement.

Sore Point—The situation has galled industry for years, and now comes the chance to rectify it. MAPI is leading a drive for safeguards against such practices in the rewriting of the technical data section Part 2, Section IX, Armed Services Procurement Regulation.

Industry agrees that the military services need some technical data, but it also believes that the government request for "all-inclusive" information is not justified. Government power to acquire a manufacturer's techical data (building secrets) is a power sufficient to deprive the producer of his principal intangible assets and in fact destroy his entire structure of business in some cases.

What U. S. Needs—Apparently the government has given little thought to how much technical data it really needs. MAPI recommends that the government's information include: 1. Necessary technical data for maintenance, operation and training. 2. Directions for emergency repairs. 3. Technical sheets for spare parts. 4. Sufficient information for the establishment of a secondary supply source. 5. Adequate technical data so that the mobilization base can be spread sufficiently for national defense. If these are the primary reasons for providing the government with technical information, then there is little need for an "all-inclusive" clause.

MAPI SOLUTIONS

1 When inclusion of technical data in a government contract is sought, it should be made the subject of special negotiations. In these negotiations the government will state how this information is to be used.

2 Government must exercise its responsibility to police threatened administrative abuses.

3 "Unlimited right to use" feature of the technical data clause which is proposed for use in government contracts cannot stand. The government has a legitimate, but limited, right to technical data which discloses manufacturing information. Why then should the government rely upon a single, inflexible, "all or nothing" contract rule for use in infinitely varied contracting situations? Unlimited power to take secret manufacturing data is a power which should be placed in no one's hands.

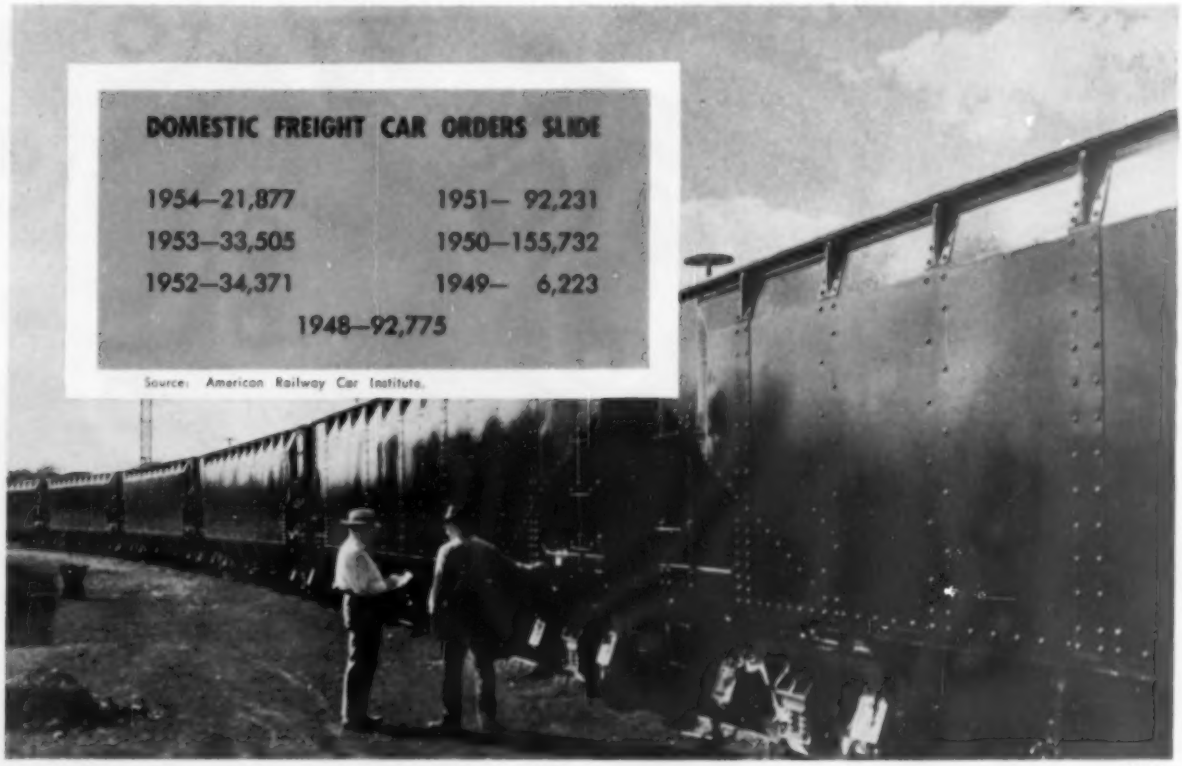
4 The government must realize that an "all or nothing" policy will tend to close a rich source of continually improving production know-how. Where a distinct possibility exists that the use of a contractor's most recent developments and designs will result in the government placing a competitor in business, incentive for getting the contract is lost.

5 Purchasing officers should not lose sight of the incentive advantage of a potential production contract award for a modified or wholly new item to the contractor who has performed the original development work on the item.

6 Technical data and copyrighted material should not be combined in the general section of ASPR. Where copyrighted or copyrightable material does contain proprietary information of substantial value, a manufacturer may be willing to grant to the government a limited right of reproduction for its use only. The same manufacturer will be far less willing to make the unlimited grant of rights proposed by the contract article as it now stands.

7 Proposed technical data clause appearing in paragraph 9-209 should be amended to include a recital of special circumstances requiring proprietary information on standard commercial articles. The question is also raised as to who is to determine the existence of "special circumstances" in such situations. Nature of such circumstances and use to which technical data is to be put is a matter for special negotiation and disputes arising in the course of such conferences should be matters for appeal under the "disputes" clause of the contract.

8 Potential effect of granting an unlimited right to use technical data disclosing manufacturing information is so serious that it is believed that the government should assume the burden of justifying its need for the acquisition of such data in every case.



C&O

Freight car buying observes the caution signals, so . . .

Railroad Steel Sales Slow Down

MORE THAN 30,000 new freight cars will be installed by the railroads this year. But sellers of steel to railroads derive only meager comfort from this estimate, made by Caleb R. Megee, vice chairman, Car Service Division, Association of American Railroads.

About 30,000 cars were put in service last year, he said, and last year was poor from the standpoint of car orders placed; the total being 21,877 cars.

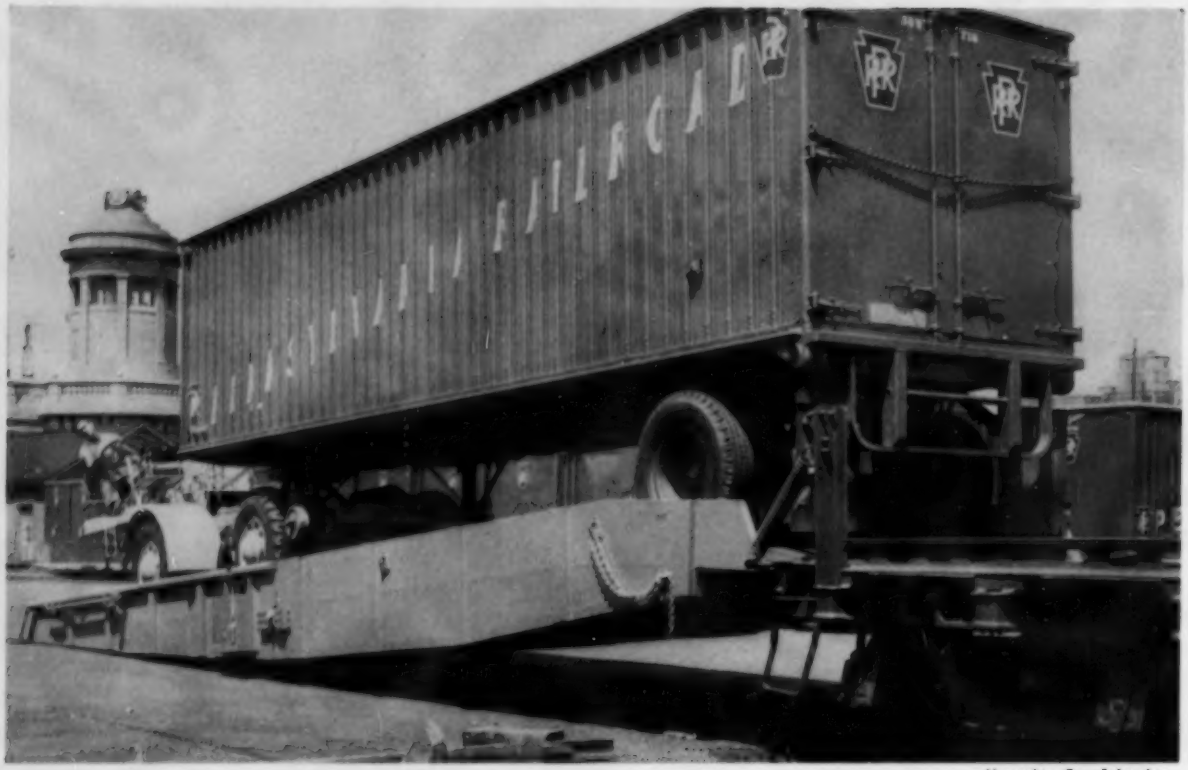
With an order backlog of 15,317 as of Jan. 1 this year, (according to the American Railway Car Institute and the Association of American Railroads) it wouldn't necessarily require the placing of many more cars this year than were awarded last to bring the total of new installations up to more than in 1954.

Order Picture—Obviously, all of the car orders placed within a year could not reasonably be expected to be installed within the same period. The closing months, for instance, could involve substantial orders, with virtually none of the equipment scheduled for installation before the end of the 12-month period.

Rail steel buying still lags badly, without prospects for any substantial improvement soon. New York Central Railroad's purchase order for 1955 (10,000 tons) has disappointed rail makers. This company's usual requirements of rail run up to 70,000 tons and higher, possibly 100,000 tons on an average, and orders are usually placed in the fall.

Rail Lags—For some time it had been thought that New York Central's needs would be off substantially this year. The railroad was scheduled to carry over 25,000 tons from last year and did. It has also developed a program for reducing the number of tracks along the main line at various points, taking rail up for use elsewhere. It has recently been announced that the main line from Buffalo to Cleveland would be reduced from four to two tracks, with a reverse signaling system installed to maintain efficient traffic movement. Results have been order-cutting below the most pessimistic forecast and, for one reason or another, various other railroads have been lagging behind in their rail steel demands.

Silver Lining—However, there's more optimism around than there was seven or eight months ago. Revised fourth-quarter freight-car orders showed a definite pick-up, totaling 8943 as against 6272 for the same period a year ago. Better carloadings and consequent boosting of railroad buying activity are also expected, to some extent reflecting the general business upturn. And more freight cars need repairs. One large carrier has a bad order car ratio of about 14 per cent against a norm of possibly 4 to 5 per cent, and various other railroads are behind on their repairs.



Magnesium Co. of America

Rail-Trailer Co. will handle this for truckers, Pennsy as a . . .

Specialist for Piggyback Volume

WATCH the operations of the Pennsylvania Railroad and Rail-Trailer Co. for a clue on whether piggybacking is going to expand into a volume business.

Rail-Trailer, Chicago, sits in the driver's seat: It's an agent for both the Pennsy and the trucking companies with Chicago-Philadelphia-New York business. Until now, most piggybacking business has been negotiated directly between the railroads and trucking firms; or, as has been the case with Pennsy, the railroads have operated their own trucks which are carried on their own freight cars.

The Whole Job—The new setup starts tomorrow, Feb. 1. Rail-Trailer will schedule in the trucks and be responsible for the loading and unloading at both receiving and departing terminals. Railroad charges will be based on distance hauled and the gross weight of the trailer and load. Trucking companies will pay Rail-Trailer for its services.

Terminal facilities, owned by the Pennsy and leased to Rail-Trailer, are being completed at the railroad's 55th-street yard in Chicago and at Meadows Yard, Kearny, N. J. The third terminal in the setup will be the Kensington yard facilities installed for Pennsy's present piggyback operations in Philadelphia. Service planned provides evening departure from New York and arrival in Chicago in time for delivery of the goods before the start of business on the second morning, says James M. Symes, president of the Pennsylvania.

GM Equipment Coming — At first, the Pennsy will be using its own flat-car equipment to haul the trailers. Rail-Trailer officials explain that as the program expands part of their service will be to lease piggyback freight cars to the railroad. "This equipment will be the new freight car being built special for this type operation by the Electro-Motive Div. of General Motors Corp."

More Volume—How's the buyer of truck and rail service going to benefit? Obviously, Rail-Trailer officials point out, the basic benefits will be to the railroads and truck firms, adding: "Railroads will get a boost in business—we're planning at least 100 trailers a night to depart out of Chicago. This will mean complete truck-trailer loaded trains, not the half dozen or so trucks now carried with other freight. And we can offer the truckers increased overall speed, plus attractive rail rates and loading and unloading charges."

But the user of truck and rail service can expect a guaranteed schedule of pickup and delivery. His concern, too, is rates: "There'll be no reduction," says one official, "but certainly if the railroads can boost their revenues it'll lessen the chances of further rate increases—of which there have been several since World War II."

Proposed Laws: Mixture as Before

Democratic control of Congress fails to show drastic changes in bills submitted thus far. Labor proposals are as expected; higher minimum wage a certainty

CONTRARY to expectations based on last November's election results, there has been no stampede in the 84th Congress to weaken the labor law. Only four bills call for repeal of the Taft-Hartley Act and simultaneous re-enactment of the Wagner Act.

Despite bleak forecasts, only one bill so far, the one introduced by James Roosevelt, would deny authority to the states to have right-to-work laws. And there is no companion to this bill in the Senate.

The Senate has a bill, written by Sen. Barry Goldwater, which would allow states to regulate strikes, picketing, boycotts and lockouts; another, by Sen. Spessard L. Holland, permits states to outlaw strikes against utilities.

Minimum Wage—Of some 80 to 90 labor bills that have been referred to the House and Senate Labor committees, more than 20 would raise the minimum pay rate of 75 cents. Most bills call for an increase to $1.25 but a number would increase it to 90 cents or $1. Several of these bills would increase greatly the scope covered by minimum wages to include employees of retail stores, etc.

There also is some concern over the results of recent investigations showing abuses in the handling of union welfare funds. About a dozen bills provide for selection of trustees and, in general, for management methods that will conserve the funds for their stated purpose. Four bills in the House would increase disability payments to longshoremen and force employers to pay attorneys' fees.

Strike Ballot — Rep. Carroll D. Kearns presented an interesting bill. It would raise from 30 to 51 the percentage of employees that must ballot before a strike vote may be recognized, and employees indulging in an unauthorized strike would lose their seniority status and other protections.

Other labor bills are spread out over a wide variety of subjects and have little chance of serious attention. They call for special treatment of the physically handicapped; stepped-up research for the prevention of silicosis; increased payments to silicosis victims; establishment of a Federal Safety Division in the Department of Labor; exemption of rural home workers from the minimum wage law; authorization of the closed shop in the printing industry; exemption of professional workers from Taft-Hartley, etc.

Other Bills Would—Let the President veto parts of bills; tax cooperatives; reverse the Standard Oil of Indiana decision (and thus nullify good faith as a defense against charges of price discrimination and revive uncertainty as to the legality of freight absorption to meet delivered prices in competition);

Also, increase the personal income tax exemption—in most cases to $1000; require trucking companies to establish joint rates with other carriers; extend Small Business Administration beyond June 30 and authorize the increase in maximum loans from $150,000 to $500,000; increase the Sherman Act maximum fine to $50,000; approve President Eisenhower's health and medical insurance program;

Also, give low-income states the preference in defense contract awards; authorize armed-services procurement from small business at prices higher than the lowest bids; eliminate government business-type operations which compete with private enterprise; broaden unemployment compensation and set federal standards;

Also, authorize the Treasury to regulate those who assist in preparing income tax returns; establish a Commission on Security in Industry to recommend legislation pertaining to espionage, plant sabotage, etc.; authorize financial rewards to inventors who aid national defense;

Also, increase parcel post limits to 100 in. and 70 lb; require all automobile tires to be sold by independent dealers; authorize $5 million for air pollution research and the extension of the Water Pollution Control Act;

Also, strengthen the law covering registration and protection of trademarks; authorize from $1 billion to $6 billion in federal aid (there are 24 of these bills) for school construction; repeal all manufacturers' excise taxes (this is a bill by Sen. Charles E. Potter) on automobiles, trucks, motorcycles, busses, trailers, tire, tubes, auto accessories and parts; enactment of stand-by economic controls for use in a possible war emergency.

Air Rights Count Here, Too

The warehouse of Weil-McClain Co., Michigan City, Ind., would have to be much larger were it not for high-stacking. These wirebound crates, stacked 16 high, contain cast iron boiler bases with shipping weights up to 315 lb. Bottom crate in each tier supports 4725 lb of dead weight

AEC Requests Plans

Atomic Energy Commission has invited private firms to submit plans by Apr. 1 for the development of atomic power reactors. If proposals show promise, government will in turn help by supplying materials, laboratory facilities and research contracts.

At the same time, AEC is offering private atomic power producers a seven-year guaranteed price for plutonium which is turned out as a by-product.

By E. C. KREUTZBERG *Washington Editor*

ODM's George Landry explains . . .

U.S. Tool-Lease Terms Tighter

MILITARY contractors and subcontractors are going to pay more to lease government-owned machine tools and production equipment. New rates are enumerated in Department of Defense directive 4215.2.

Taking effect Feb. 2, the rates will be 2 per cent a month, on the acquisition cost, for tools manufactured in 1950 and subsequent years; 1.5 per cent a month for tools built in 1942 through 1949 and 1 per cent a month on tools built prior to 1942. These rates will apply regardless of equipment condition, and on a basis of equipment availability rather than the length of time the tools are actually used.

Application—It remains to be seen how extensively the higher rates will be applied. This is because of authorized exceptions which could conceivably apply to almost all leasing arrangements. As examples: Contracting officers can use their judgment on rates, while another provision stipulates that new rates are not to apply on leases now in effect or under negotiation. This will make rates above 1 per cent an exception for some time to come.

Builders do feel though that the principle which they have been arguing for has been accepted as passage of the directive now opens possibilities for making further progress in getting the government out of competition with private business in the capital equipment field.

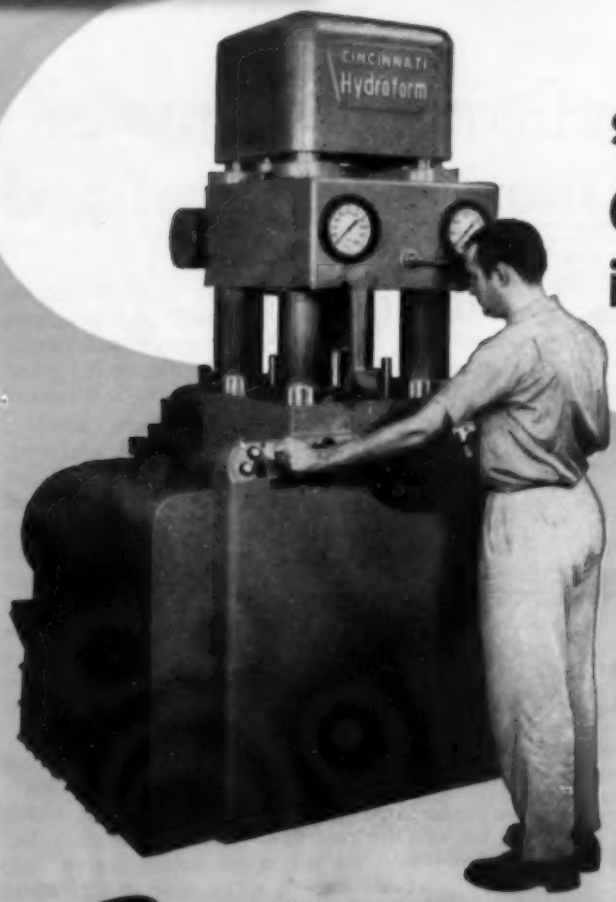
Nondefense Leasing—Expressing the government's viewpoint, George A. Landry, assistant director for production, Office of Defense Mobilization, declares that much of the current comment grossly exaggerates how much equipment the government is leasing for nondefense purposes. The retired Western Electric vice president (in charge of purchasing and traffic) states that to date ODM has approved only 11 leases of government-owned tools for nondefense use. These involve 377 items with an aggregate acquisition cost of $2,757,000. Government owns about 500,000 pieces of equipment with a total cost close to $8 billion.

These leases for nondefense use are approved only when they are in the best interests of national defense, Mr. Landry told STEEL. The question of nondefense use leasing comes up only in connection with equipment left over from defense production contracts and when the problem of keeping equipment in contractor's plants or moving it to a warehouse requires decision.

Special Considerations — Frequently equipment for manufacture of a military end-item can be kept in a "package" at the contractor's plant by allowing him to use it for nondefense work on a limited scale. Certain of these contracts also call for standby maintenance of the entire package.

It may be necessary to allow a contractor to use an elephant tool on a limited basis to avoid the expense and risk of moving it. There are other cases where plant shutdowns and labor layoffs can be avoided if contractors are permitted to lease tools for nondefense work for a few months pending receipt of newly ordered tools from the builder.

Under no circumstances, says Mr. Landry, is a lease approved just to raise government revenue.



small size producer of BIG SIZE SAVINGS in metal forming . . .

The New Cincinnati 8" Hydroform

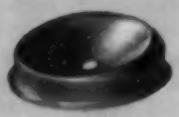
The new Cincinnati 8" Hydroform duplicates the performance of its larger family members—the 12", 19", 23", 26", and 32" size machines—by producing a wide variety of deep drawn parts . . . with lower tooling costs . . . at a faster rate . . . and with higher standards of quality than is possible to obtain by other methods.

And it takes up less plant floor space than some soft drink dispensing machines occupy.

Typical examples of work formed on the 8" Hydroform are shown at left. Listed below is a table of major machine specifications.

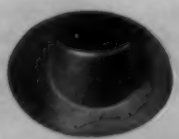
If your manufacturing requires the production of drawn shapes in small lots—or extensive development work prior to quantity production—let a Cincinnati Milling field engineer show you how the many Hydroforming advantages can be profitably applied to your work. For a description of the Hydroforming process and specifications of the six machine sizes, write for Bulletin M-1759-3.

Cross-over Duct of .035" Type 321 stainless steel, drawn with contoured flange in one operation.



Reflector of .020" Aluminum, drawn, pierced and trimmed in one operation.

Electrical Detail of .042" stainless steel, drawn in two operations.



Jet Engine Detail of .032" Inconel, drawn with flange on an angle with the balance of the part in one operation.

Cover of .060" 250 Aluminum, drawn in one operation.

Work Capacity:
Maximum Blank Diameter—8"
Maximum Draw Depth—5"
Maximum Blank Gage—⅛" Steel
Maximum Forming Pressure—15,000 psi

Machine Operating Rate:
Maximum—200 cycles per hour

Dimensions:
5' x 3' x 7½' high

Weight:
Machine Net—12,000 lbs.

Installation:
Floor Mounted. Requires water and electrical connections.

Hydroform

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.

CINCINNATI

Having trouble making ends meet?

Is your 1955 advertising budget slightly small for the big job expected of it?

There are several ways you can s-t-r-e-t-c-h that budget.

1. **By doing something with layout and copy appeals that will step up the effectiveness of the white space you buy.**
2. **By re-evaluating the publication picture in the light of today's opportunities, and comparing the *effective coverage* each magazine gives you per dollars invested.**
3. **By merchandising your advertising to salesmen, distributors' salesmen, and selected prospects to get added impact from each ad.**

The *first* calls for a method of measuring attention and readership. That's where Starch reports can help you. Three Penton publications are regularly "Starched" and reports are available from Daniel Starch & Staff. All Penton publications offer helpful information that will assist you in tailoring your advertising to their audiences.

The *second* involves better yardsticks to aid in space buying. Here, too, Penton can give you a lot of help. For instance, we have standardized on the modern Standard Industrial Classification of the U.S. Census Bureau to aid you in making comparisons. Plant counts, and size of plant, so necessary in determining *effective coverage* are available on *all* of our publications.

The *third* way to stretch your budget—merchandising your advertising—is one in which we are prepared to help you with reprints, direct mail service, and special list selections.

Will you call on us for cooperation?

THE PENTON PUBLISHING COMPANY

PENTON BUILDING • CLEVELAND 13, OHIO

Export-Import Bank gives metalworking . . .

Long-Term Aid for Export

AN EFFECTIVE answer to a nagging problem: That's the Export-Import Bank program of guaranteeing foreign credit to help finance U. S. export shipments.

Under these lines of credit, American exporters must receive not less than 20 per cent of the invoice value of each export sale in cash and participate in the financing by carrying not less than 25 per cent of the remainder. Under those conditions the Export-Import Bank is guaranteeing against default the payment of up to 75 per cent of the deferred portion of such sales.

Selective—Not all types of products will receive these lines of credits. Ex-Im is interested in aiding exports of productive capital equipment which will make the foreign market better for all kinds of American goods.

Thus the list of companies which have been granted these credit lines reads like a metalworking industry blue book: Combustion Engineering - Superheater Inc., Oliver Corp., Worthington Corp., Le Tourneau-Westinghouse Co., Barber-Greene Co., Thew Shovel Co., Minneapolis-Moline Co., Jaeger Machine Co., Athey Products Corp., Schramm Inc., and Chain Belt Co.

Testimonial—Said P. W. Mortimer, export manager of Minneapolis-Moline: "Our problem has not particularly been to sell Minneapolis-Moline farm machinery abroad but to meet the competition in credit terms offered by most foreign manufacturers. Our American - made equipment is eagerly sought because of its advanced design and high quality. But American manufacturers have been unable to allow long-term credit until now. This Export-Import Bank line of credit will enable more customers in foreign countries to get the machines we make with payments more convenient to themselves."

The Export-Import does not actually lend any money in these cases. "We prefer that that be handled by the private commercial bank of the exporter," said an Ex-Im official. "And there's a top limit of $10 million on the guarantee to any one company." Largest line of credit extended to this date has been one for $6 million to Combustion Engineering.

Deep Well—No one knows as yet how large this export assistance program will grow. Theoretically it's limited only by the uncommitted lending authority of the Export-Import Bank, presently at about $1.6 billion. But that could be enlarged, too, through Congressional action.

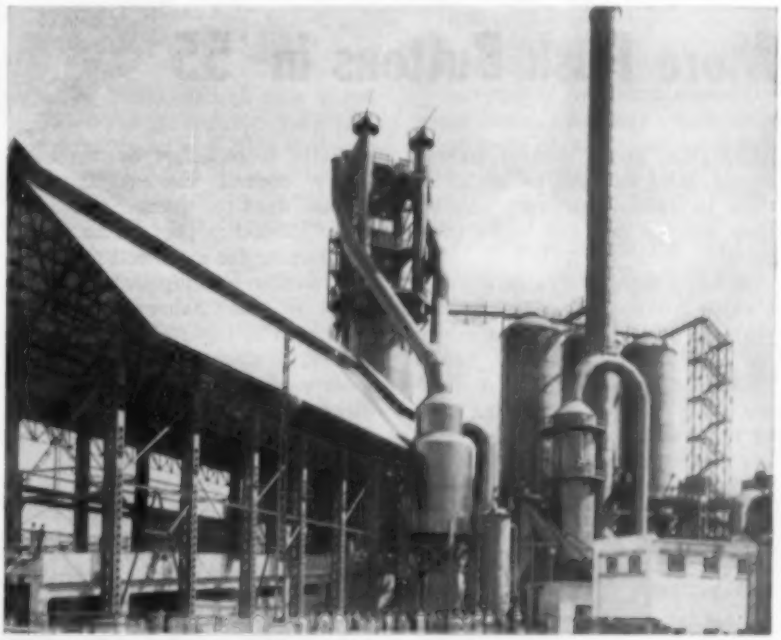
So U. S. capital equipment exporters may find that this is indeed the answer to the old and irritating problem of longer credit forms for export sales.

Europe's Steel Output

European steel producers slightly outdistanced STEEL's estimate for 1954 steel production. We figured the Western European nations (West Germany, Belgium, France, Saar, Italy, Luxemburg and Netherlands) would turn out 47.4 million net tons of steel in 1954 (Jan. 3, p. 148); they actually produced 48.1 million net tons.

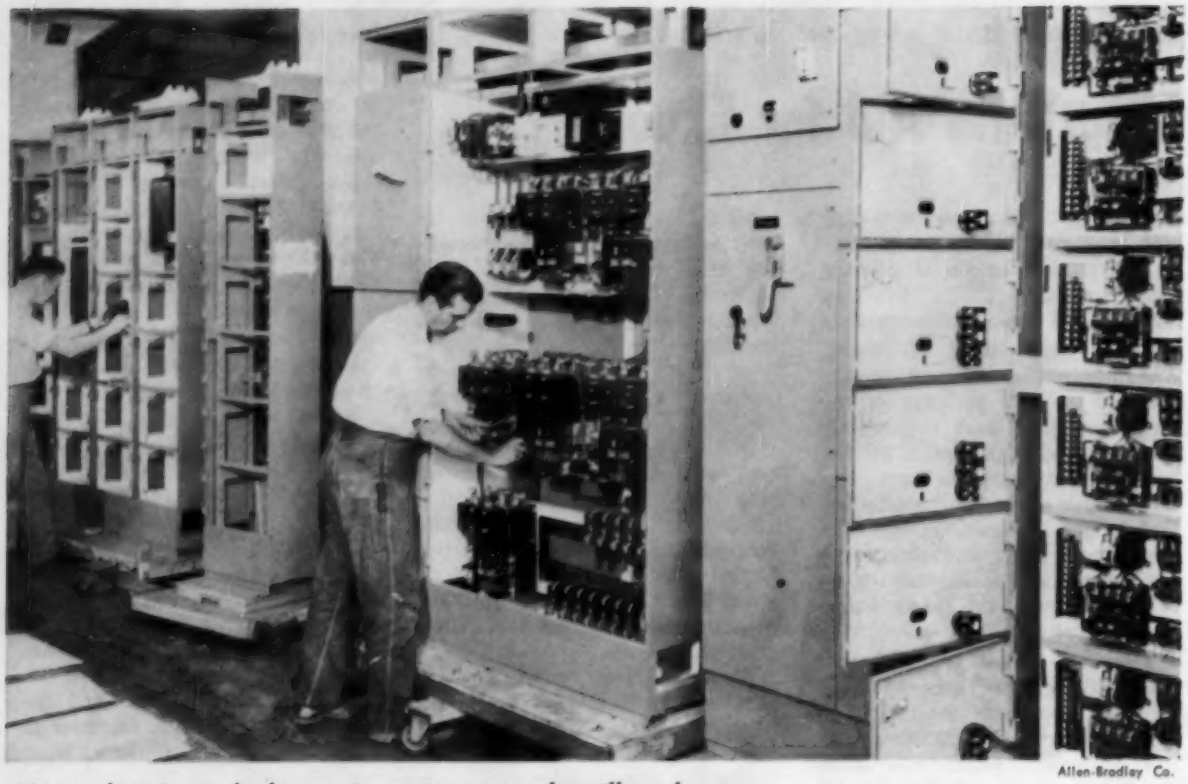
Production by individual countries was West Germany, 19.1 million net tons; Belgium, 5.5 million tons; France, 11.7 million tons; Saar, 30.8 million tons; Italy, 4.6 million tons; Luxemburg, 3.1 million tons and the Netherlands, 1.0 million tons.

British steel output narrowly missed 20 million net tons (19.4 million) for 1954. Forecast for 1955 is 20.5 million net tons. New plant being installed includes a new tinplate mill at Ebb Vale and improved coal reduction facilities at the John Summers works at Shotton.



Backbone for Growing Mexican Industry

This is blast furnace No. 2 at Fundidora de Fierro y Acero de Monterrey, Mexico. Fundidora operates two blast furnaces, one 300-ton unit and one 500-ton unit, as well as five open hearths, one bessemer and facilities for rolling bars, structural shapes and other products. Lewis Foundry & Machine Co. is building a new $3.5-million merchant mill for Fundidora, to be ready by late '55



Allen-Bradley Co.

More electric and electronic motor controls will make . . .

More Push Buttons in '55

ELECTRIC motor control makers expect sales in 1955 to be better than in 1954 — but only because they will go out and make them better.

Reading Sign—Actually, signs of a sales increase about balance out portents of decreasing sales except for one factor. Industry has a feeling of optimism in first quarter, 1955 (not present during most of 1954) which motor control makers plan to convert into sales.

Estimates from industry executives range from 10 per cent up to even sales in 1955 compared with 1954 or between $300 million and $330 million.

Look at the Ledger—The trend toward automation, points out Cutler-Hammer Inc., colors the whole motor control industry and is one of the strongest factors on the plus side of the ledger. Says General Electric Co.: "The minor reduction in total expenditures (for new plant and equipment in 1955) is expected to be offset by increased motor control content in new plants due to greater automaticity." Another plus factor is active buying for steel mill finishing and auxiliary equipment as indicated by Allis-Chalmers Mfg. Co.'s expansion in this field.

Electric Controller & Mfg. Co.'s sales manager, W. R. Yorkey, indicates steel mill business is reviving for his company, too, together with cement mills (tied in with the projected federal road building program), and lifting magnets for steel and scrap handling.

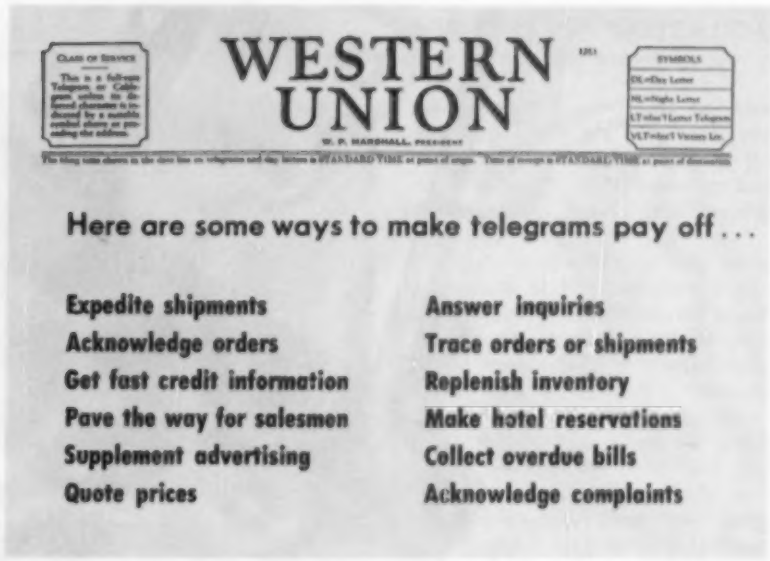
Control manufacturers are certain they cannot passively wait for the trend toward automation to bolster sales, however. "As are all aggressive concerns, we are sharpening our sales tools, with new designs being our most effective weapons," says F. H. Roby, vice president, Square D Co., Detroit. "Of course, we have also revitalized our sales organization . . ."

Second the Motion — That approach is echoed by Allen-Bradley Co.'s chief engineer, J. J. Mellon. "Automation is playing an important part in the development of electric and electronic motor controls. We have to keep shifting our products to meet the needs of this market."

Prepared — Says Westinghouse Electric Corp.'s Motor & Control Division in Buffalo: "In the last five years our control product line has been completely modernized. We are also planning several new products for the '55 markets. With this modernization and new products, we are in our best selling position in the past ten years."

But the nub of control manufacturers approach to the 1955 market is a real attempt to do a better selling job.

"We're going to make 1955 a better year for sales by concentrating on the sales efforts," says E. R. Jung, vice president, Clark Controller Co., Cleveland. "Holding onto our high quality, we're pushing for better market coverage and better deliveries even of custom-tailored jobs."



Speed up your communications system by . . .

Putting Telegrams To Work for You

Accuracy, having a written record and the attention-getting factor are all plus values. Other services are available that can make your wire a valuable business ally

ARE YOU getting the most out of your communications dollar?

A telegram can often speed your business and save you money at the same time. Here are some points to consider: 1. Will the person you are contacting have to think the matter over, consult others or look up data? 2. Are you giving "one-way" information? 3. Is the person you are calling a "talker." Do you want a written record?

Accuracy—That written record can be important especially when quoting prices or giving orders. Talk isn't cheap if your message is misunderstood.

On the other hand, the telephone is best to use where there must be an interchange of ideas, where you have to talk something over. And where detail and completeness are more important than speed, it's usually best to send a letter.

Speed—You can send a letter by wire, too. Speed is the criterion to use. A full-rate telegram is fastest. Day and night letters give same-day and overnight service, respectively, and are considerably cheaper than the full-rate wires.

Remember in making your telegram to be concise *but complete*. Extra words cost little and are a lot cheaper than having to send a second message to clarify the first one.

No Charge—There is no charge for addresses, even for long ones, except in unusual cases. Signatures are also free and can include your title or company name. Punctuation is free too.

If your total communication costs between any two points are over $75 per month, it may pay you to install a private wire service. That's what Western Union says. And they'll send out an expert free of charge to help you find out. American Telephone & Telegraph Co. offers a similar service.

Automation—Your private wire can be worked into your automation plans. For example, common language tapes can be used to send messages, to transfer data to punched cards, to operate machine tools set up to use them.

Here are some other ways you can use Western Union. It will make hotel reservations for you; deliver packages locally, or nationally by air freight; take market and opinion surveys.

Service—If you want to send the same message to many people, take advantage of a "book" telegram. Just give Western Union the message and list of addresses; they'll do the rest.

In some locations you can get "automatic selective switching." That means distant customers can get in touch with you faster. Greenfield Tap & Die Corp., Greenfield, Mass., says they get messages across the continent in three minutes.

Discount—Also on your direct line you get a 20-per-cent quantity discount for all messages over 100 per month. If you're close to that number, a few more may literally pay for themselves.

A newer type of service is Desk-Fax and Intrafax, which send out a picture of your message, or even charts and drawings. A later model transmits standard 8½ by 11-inch forms or letters in less than three minutes.

And, oh yes, if you are so inclined, you can still send a singing telegram in some localities.

To our Favorite Boss!

From the receptionist at the front door through to the last man on the loading platform—*all* of us here at Great Lakes Steel have a very important *something* in common. It is the knowledge that your continued and expanded need for our products determines the future and growth of every one of us, regardless of our individual jobs here.

It is the knowledge that *you*, Mr. Customer, are the boss!

That's why we at Great Lakes are seeing to it that our steel is the kind you have a right to expect from a specialist in flat-rolled products. We know the importance of prompt shipments, top quality, proper packaging and loading, dependable information, and clerical accuracy. We think you'll agree that our many satisfied customers are a pretty good indication that this policy is good business for all concerned.

Next time you have a problem in steel, call on one of our representatives to help you solve it. You'll be glad you did!

Great Lakes Steel

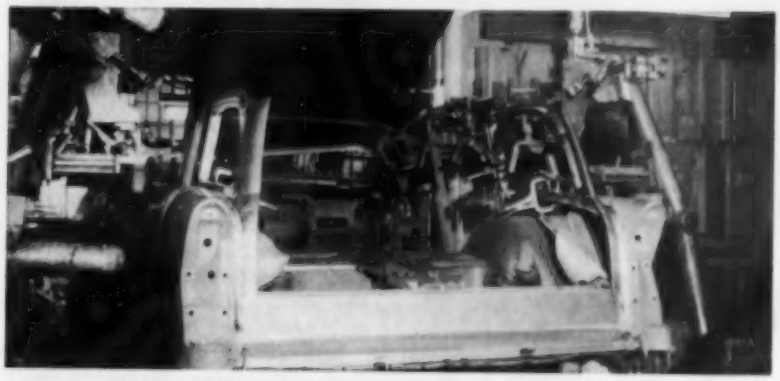
Ecorse, Detroit 29, Michigan

UNIT OF NATIONAL STEEL CORPORATION

PRODUCERS OF N-A-X HIGH-TENSILE STEEL

SALES OFFICES IN BOSTON, CHICAGO, CINCINNATI, CLEVELAND, HOUSTON, INDIANAPOLIS, LANSING, LOS ANGELES, NEW YORK, PHILADELPHIA, PITTSBURGH, ROCHESTER, ST. LOUIS, SAN FRANCISCO AND TORONTO

Roof rails are removed, wheel wells opened . . .



New parts are aligned, clamped for welding . . .

And another station wagon waits for paint as . . .

Chair Maker Becomes Body Builder

THE PATHWAY to "automotive supplier" has been devious in many instances. But perhaps none is more unusual than that of the nation's largest independent producer of finished automobile bodies, Ionia Mfg. Co. Until 1941 it was a furniture builder.

Credit for the evolution goes to present head of the firm, Don Mitchell, who spent his early years with auto body building companies. When in 1938 Mr. Mitchell became a consultant to the firm, then Ypsilanti Reed Furniture Co., he found the furniture business was almost non-existent for reed products. With his experience and connections almost entirely in the auto industry, it becomes obvious which course Reed Furniture was to take.

Background—Key to this metamorphosis is the fact that furniture requires upholstery on wooden frames. A station wagon once was a vehicle with a wooden body which had seats in it. Already equipped with woodworking equipment which had produced truck bodies during the war and upholstering equipment which had produced seats, Ionia was in a good position to jump into the station wagon field when hostilities ceased.

Experience gained in the production of wooden cargo-truck bodies during the war paid off. Experimentation, revision and innovation had created for the company a method of mass-producing wooden bodies for vehicles. The Ionia plant's production line, with a minimum of costly tools and dies, could turn out 160 bodies per day. Prewar methods of others reportedly could only turn out a dozen or less per day.

Argument—With Don Mitchell's understanding of the auto industry, he was quick to point out to General Motors how he could supply the bodies with which they could meet the growing demand for station wagons without special tooling themselves, or diverting the then particularly precious plant space to the operations. He pointed out that volume was too low for Fisher Body, yet too great to be met by custom shops.

Having made no production model station wagons prior to 1946, General Motors added station wagons built by Ionia to its 1946 and 1947 Pontiac and Chevrolet lines. It has been making station wagon bodies ever since. As the bodies have evolved from wood to metal trimmed with wood to entirely metal, Ionia Mfg. Co. has evolved along with them.

Today the firm turns out 140 Mercury station wagon bodies on two shifts and about 45 Buick station wagon bodies on one shift. Although station wagon sales have

mounted rapidly since the war, the method of their construction is an interesting intermediate volume operation.

Buick, for Example—To build a Buick station wagon, you start with a four-door sedan body minus the roof panel and unbuild it. As shown in the photos, the rear roof rail is removed along with the inner rear quarter panel. Meanwhile the rear doors are sent to a separate department where the top and rear channel frames are removed and replaced with new Ionia parts to form a square top matching the new door opening.

The body shell, or cowl as the workmen call it, is meanwhile proceeding up a line in the first floor where the rear seat filler plate is welded in over the differential clearance hump in the floor pan and the body is further readied to receive the new upper rear quarter panel.

Technique — This takes place several floors up where the body arrives by elevator and enters the swing type fixture with the new parts clamped in place temporarily. As may be seen by close scrutiny of the photo, they include the new upper rear quarter panel, new rear lower panel, new rear roof bow and the new roof panel. The new roof rail is joined to the old at the body center post by brazing, while all other joints are tacked with electric guns and finish welded electrically after the body leaves the fixture.

In addition, the new interior rear quarter panel is added, seams are leaded and doors installed as the body moves down the line toward paint and finish operations. After paint and finish to factory specification glass is added and the body then receives its first water test. Following a trip through a typical trim line differing from most only in its custom-built atmosphere (with such touches as steaming to eliminate fabric wrinkles), the body is again water tested, cleaned and prepared for shipment. Six station wagon bodies replace six incoming cowls on the haulaway truck and their arrival is keyed into the Buick assembly schedule.

Mercury Manner—Unusual in a somewhat different way is the Mercury body assembly. Conveyors transport sub-assemblies and stampings to the fourth floor from boxcars received from Ford. Received in the proper sequence for assembly, the parts are assembled into the basic structure in three fixtures. That is possible because of the sub-assembled nature of many of the components. Side assemblies, for example, are shipped complete and for space reasons with the doors already mounted. Tacked in the main body framing fixture, the bodies are finish-welded on down the line to keep the fixture in use a minimum time on each unit.

A body after emerging from Bonderite may then make as many as three trips through the paint and finish system: Twice if multiple body colors are required and once more if the body is to be Dinoc covered. Dinoc is the trade name for the transfers which are applied to the side of the station wagon body to give the appearance of wood. Softened in water for formability, these sheets bearing part numbers are precut to shape and applied to an adhesive sprayed on the appropriate body part.

Simulated — Girls swarm over the bodies with squeegees in hand removing water trapped under the Dinoc. A complete body can be finished in about 15 minutes. Dinoc, incidentally, can be waxed along with the rest of the car body and retains its finish indefinitely. But woe to the man who decides to sand his paneling to refinish it! Even the molding on the sides of the bodies which has all the appearance of the wood trim used a few years ago, is actually glass fiber received by Ionia with the Dinoc or simulated wood transfer already applied.

Other exterior molding and trim are also added. Because trim differs on various models, holes are not punched in the panels when formed but are drilled by workmen using the appropriate jig for the model being built.

Other Lines — Extent of the Mercury station wagon body facilities may be given by the fact that there are about 400 bodies in the system at any given time. But the firm has also dabbled in many other vehicles of intermediate volume in the past. Among them were the Packard Caribbean, a Dodge 4-door station wagon and the Willys personnel carrier, a lengthened and reworked jeep.

In addition to its mass production customizing, Ionia has built the Packard Panther dream-type automobile. Today, as a result of merger with Owosso Mfg. Co. to form Mitchell-Bentley Corp., the firm is heartily diversified.

Other Products—In addition to Buick and Mercury station wagon bodies it makes Burroughs adding machine stands; interior trim sets for Studebaker, Nash, Buick and Mercury; folding chairs; bus seats; Chevrolet truck seat frames; plastic medallions for current cars; plastic cripser trays for Nash-Kelvinator; and plastic door handles, panels and name plates for numerous refrigerator manufacturers. At one time the firm listed 57 different items in its catalog, including television cabinets.

Gradually Ionia Mfg. Co. is divorcing itself from some of its minor business. Although Don Mitchell keeps a watchful eye on possibilities in other industries, and is always willing to investigate a proposition, he believes Ionia Mfg. will continue to prosper in its role of auto supplier.

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,778	614,000
February	573,801	628,017
March	672,485	752,149
April	676,248	782,491
May	621,262	684,843
June	623,732	713,778
July	543,540	756,592
August	523,799	640,186
September	364,441	605,228
October	312,078	651,153
November	616,395	458,567
December	762,209†	529,588
Total	6,884,768†	7,816,592

Week Ended	1954	1953
Dec. 25	149,418	92,247
	1955	1954
Jan. 1	148,436	93,293
Jan. 8	177,877	152,418
Jan. 15	184,362	149,841
Jan. 22	193,207	146,741
Jan. 29	191,000*	149,841

Source: Ward's Automotive Reports. †Preliminary. *Estimated by STEEL.

Shooting Completed – **NEW DIE CASTING FILM NOW READY!**

Get the Facts on ZINC Die Casting ECONOMIES

When you see the new motion picture "DIE CASTING—How Else Would You Make It?" (just released by the American Zinc Institute, Inc.) you will learn the basic reasons why ZINC Die Castings are so low in cost. You will find, for example, that their economy begins with the kind of machine on which they are produced.

The above scene from the new film shows a battery of high speed ZINC die casting machines. *Only* ZINC, among the principal die casting metals, can be cast in these machines. And this maximum production speed means minimum die casting costs to you.

But the 35-minute motion picture is not confined to the actual casting procedure. It also covers part design, die design, secondary operations, finishing and applications. It not only will help you to bring ZINC into proper focus among die casting metals but it establishes the relationship of die casting to other high speed production methods.

HOW TO SEE THE NEW FILM—

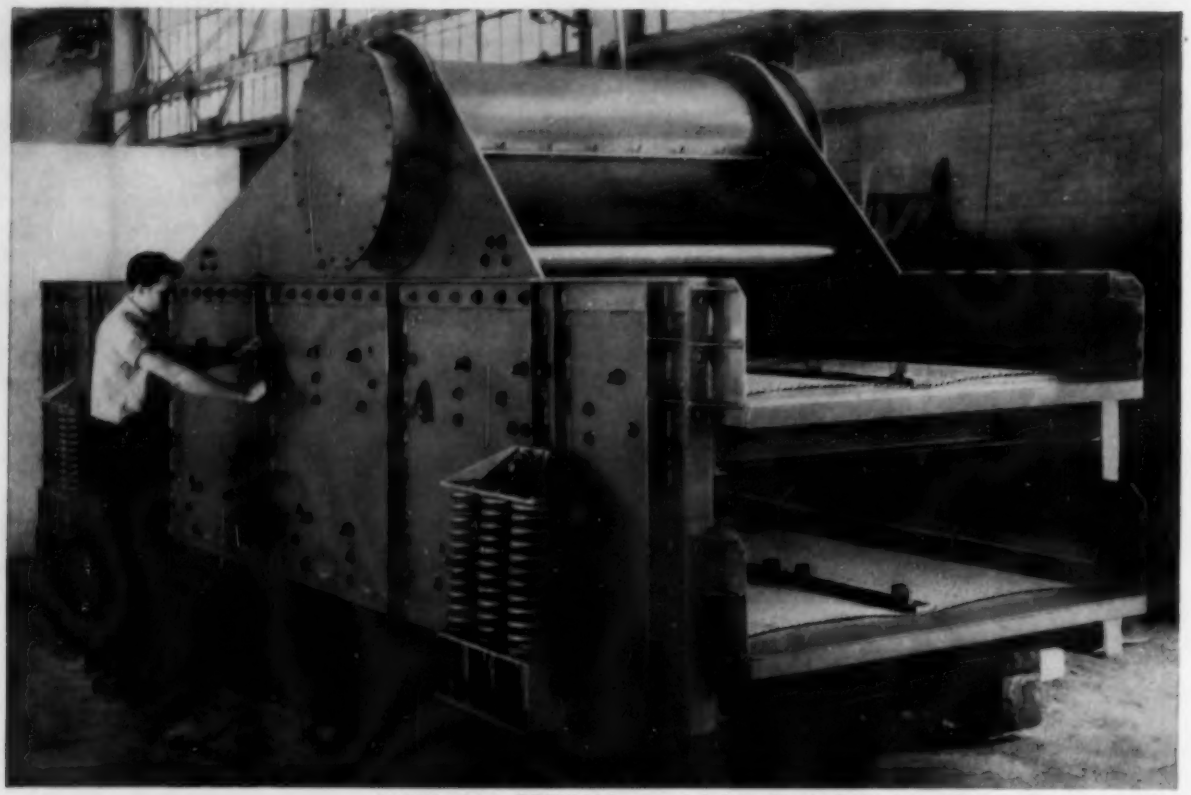
If you have access to projection equipment (the film is 16 mm. Kodachrome with sound) and can arrange to get a group together to see the picture, a print can be borrowed free-of-charge from the American Zinc Institute, Inc., 60 East 42nd Street, New York 17, New York. When writing, try to give several alternate dates for the showing and advise the size of the audience (you will also receive copies of a new 24-page booklet on die castings for those viewing the film).

The New Jersey Zinc Company
160 Front St., New York 38, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC



ASSEMBLING an RB&W high-strength bolt on Hewitt-Robins' new Eliptex vibrating machine.

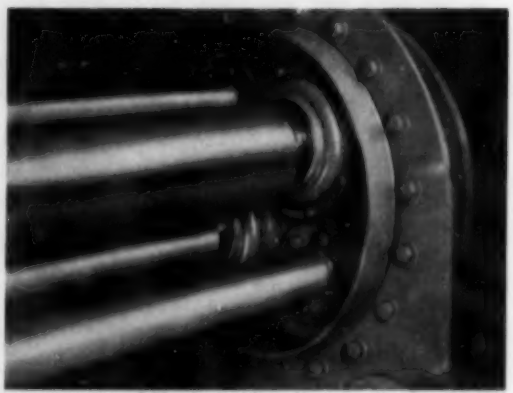
Standardizing on high-strength bolts saves Hewitt-Robins 25%—improves product!

Take a hard look at your fastening operations and you may find you will save a lot by using standard high-strength bolts instead of expensive specials.

Using a standard RB&W high-strength bolt plus a heavy semi-finished nut with two hardened washers, Hewitt-Robins is getting these advantages and savings on vibrating machines: 1. Saving 25% in yearly fastener cost. 2. Eliminating situations requiring body-bound connections with attendant reaming operations. 3. Eliminating all special, finished bolts with varied thread lengths and also all special lock nuts. 4. Eliminating procurement problems and slow delivery of specials. 5. Reducing nut and bolt inventory. 6. Obtaining better performance and lower maintenance on units.

The RB&W product has 2½ to 3 times the clamping force of the previous fasteners. Thus the assembled connection is better able to withstand severe vibration.

Maybe your operation doesn't give fasteners as hard a time as vibrating equipment, but it pays to look into the savings you can expect from specifying standards instead of specials. RB&W has the answers to your questions.



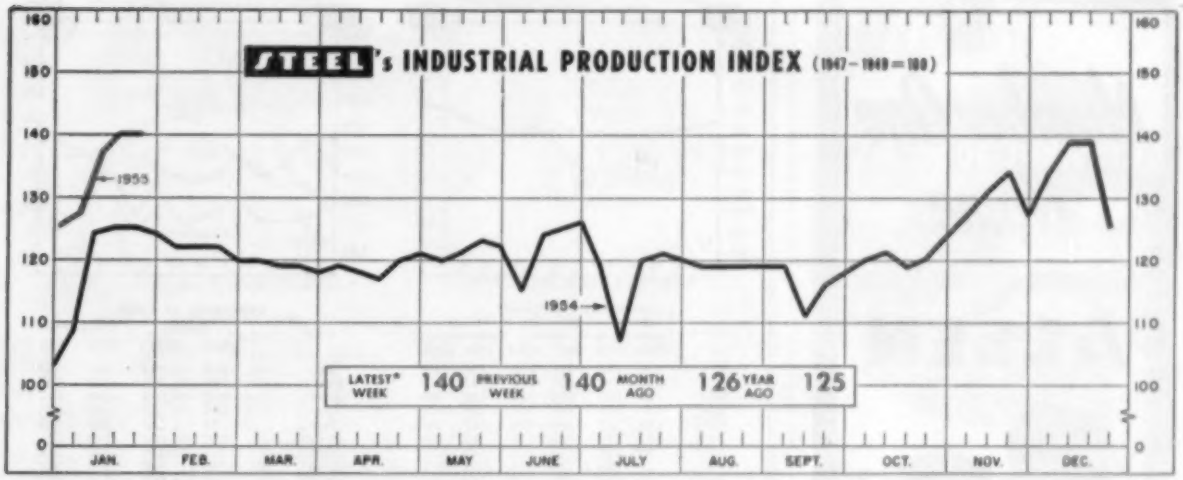
DETAIL VIEW of Hewitt-Robins vibrator, showing RB&W high-strength bolts which must resist shear stress as well as vibration. 4.8

See our insert on high-strength bolts in Sweet's Architectural and Industrial Construction Files.

RB&W **RUSSELL, BURDSALL & WARD**

109 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Plants at: PORT CHESTER, N.Y.; CORAOPOLIS, PA.; ROCK FALLS, ILL.; LOS ANGELES, CALIF. *Additional sales offices at:* ARDMORE (PHILA.), PA.; PITTSBURGH; DETROIT; CHICAGO; DALLAS; SAN FRANCISCO. *Sales agents at:* NEW ORLEANS, DENVER, SEATTLE. *Distributors from coast to coast.*



*Week ended Jan. 22. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%

Industry Sprints in First Weeks of 1955

INDUSTRIAL PRODUCTION has jumped off to a strong start in 1955. So far it is even ahead of 1953, generally regarded as the best year American industry ever had.

STEEL's industrial production index, for example, is at 140 (1947-1949 = 100). That's higher than it got in boom 1953. And chances are good that the index will hold at about its present level or even rise a little more through first quarter.

Steel Up — Steel production is running along at above 80 per cent of capacity. In the week just ended, output was estimated at 84 per cent, or 2,027,000 net tons, by American Iron & Steel Institute. That is more steel than was produced in any week of 1954 and is getting close to 1953 levels, tonnagewise. Per cent of capacity figures don't compare so favorably, but that's because of the industry's increased facilities.

Electric power output is sparking along at record-breaking levels. The latest week reported by Edison Electric Institute shows a new high of 9928 million kilowatt-hours. This is one factor in STEEL's index that can be expected to show further gains. It should not be too long before production reaches 1 billion kwhr weekly.

Gains Ahead—An increase in industrial consumption can be expected through the first quarter on the basis of expected gains in production. Longer days may tend to cut down on residential usage, but not appreciably, because of the continuing popularity of television and electric appliances.

Barring widespread nuisance strikes or worker slowdowns in the auto industry, the first quarter should be a good one. Production is close to breaking all kinds of records, and the automakers, spurred on by strong sales and the possibility of a late spring strike, seem to have little inclination to cut back schedules.

Sales Race—Another Ford-Chevrolet sales race is a certainty, giving an added spur to high produc-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,027	2,008	1,802
Electric Power Distributed (million kwhr)	9,850[1]	9,928	8,976
Bitum. Coal Output (1000 tons)	8,675	8,510	8,180
Petroleum Production (daily av.—1000 bbl)	6,620[1]	6,689	6,292
Construction Volume (ENR—millions)	$257.2	$364.7	$173.5
Automobile, Truck Output (Ward's—units)	193,207	184,362	146,741
TRADE			
Freight Car Loadings (unit—1000 cars)	638[1]	645	617
Business Failures (Dun & Bradstreet, no.)	206[1]	200	208
Currency in Circulation (millions)[3]	$30.0	$30.2	$30.1
Dept. Store Sales (changes from year ago)[3]	+16%	+13%	−8%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,161	$18,897	$19,211
Federal Gross Debt. (billions)	$278.5	$278.5	$275.2
Bond Volume, NYSE (millions)	$20.9	$25.7	$22.7
Stocks Sales, NYSE (thousands of shares)	14,017	17,369	9,018
Loans and Investments (billions)[4]	$85.5	$85.8	$80.4
U. S. Gov't. Obligations Held (billions)[4]	$36.5	$36.6	$32.9
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.74
STEEL's Nonferrous Metal Price Index[6]	216.4	216.9	203.2
All Commodities[7]	110.1	110.1	110.9
Commodities Other Than Farm & Foods[7]	115.1	115.1	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,394,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

THE
Number One
Name
In Socket Screws & Keys
ALLEN

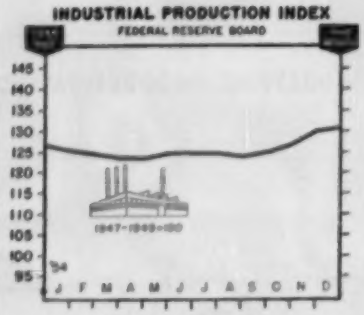
Don't take it for granted that any hex socket screw is an Allen. Your Allen Distributor *alone* can offer you

1. **ALLENPOINT SET SCREWS** with the new smaller point — proved by impartial laboratory tests to have greater locking power and vibration resistance, plus uniformly high shaft holding power, compared with conventional cup point screws and those with serrated or angled points.
2. **LEADER POINT CAP SCREWS,** for substantially reduced chance of thread injury or damage to threaded holes.
3. **ALLENOY STEEL** — with the strength and temper to permit the use of smaller sizes, and make button head and flat head screws practical despite necessarily shallower sockets.
4. **ALLEN PROGRESSIVE PRESSUR-FORMING,** producing contoured uncut fiber flow, from head to point. A process originated and perfected by Allen.

Be sure to get Allens in the black and silver striped box, sold only through leading Industrial Distributors. Write us for technical information.

THE BUSINESS TREND

INDUSTRIAL PRODUCTION INDEX
FEDERAL RESERVE BOARD

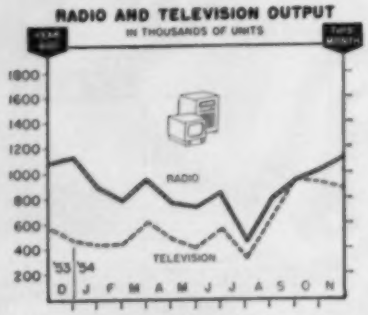


(seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1954	1953	1954	1953	1954	1953
Jan.	125	134	111	135	155	168
Feb.	124	134	108	137	153	168
Mar.	123	135	103	136	145	165
Apr.	123	136	104	136	146	169
May	124	137	106	139	147	169
June	124	136	105	137	145	168
July	124	137	104	136	148	171
Aug.	123	136	105	137	148	171
Sept.	124	133	117	130	148	166
Oct.	126	132	110	128	149	165
Nov.	129	129	118	122	155	159
Dec.*	130	126	120	113	156	156
Avg.	125	134	110	133	150	167

Federal Reserve Board. *Preliminary.

RADIO AND TELEVISION OUTPUT
IN THOUSANDS OF UNITS



Thousands of Units

	Radio		Television	
	1954	1953	1954	1953
Jan.	872	1,093	421	719
Feb.	780	1,192	427	731
Mar.	940	1,549	600	810
Apr.	745	1,150	458	568
May	722	1,109	396	482
June	838	1,164	544	524
July	438	674	307	316
Aug.	785	992	633	604
Sept.	932	1,217	945	770
Oct.	998	1,052	921	680
Nov.	1,099	1,066	859	560
Dec.	...	1,101	...	450
Total	...	13,368	...	7,214

Radio-Electronics-Television Mfrs. Assn.

Charts Copyright 1955 STEEL.

tion. Both makes have a chance to win the 1954 race, says *Ward's Automotive Reports.* Ford seems to have a slight edge in passenger car sales, but Chevvy is leading in combined car and truck sales. So there could be a double winner. No matter who wins, competition is hardly liable to lessen, especially with the restyled Plymouth making a bid to get back into third place.

Railroads Pick Up . . .

Freight car loadings were a weak sister in the production index during most of 1954. Now they are picking up, but it will be a hard climb back to 1953 levels. But a better year than 1954 seems assured. Just how much the increase in traffic will add to railroad building and steel buying is not definite (See p. 41).

But freight car buying has shown a small pickup, with the result that backlogs have grown every month since last October. On order as of Jan. 1 are 15,317 cars, according to American Railway Car Institute. But that's little more than half the number of a year ago.

Locomotive orders are also on the upgrade, at least temporarily. The new year began with 493 on order, compared with only 267 a month earlier. A year ago 571 were on order.

Employment Improves . . .

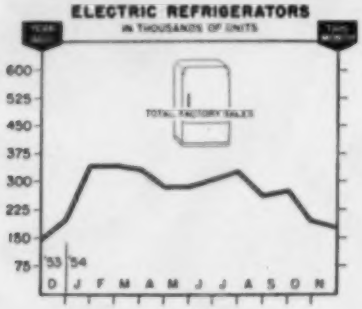
Continued improvement in employment can be expected through the rest of first quarter. The Labor department says slight to moderate gains are ahead in two-thirds of the nation's major production centers.

Taking part in increases will be the motor vehicle industry, primary iron and steel production, farm machinery and appliances. For the most part those same industries played the major role in recent employment gains.

As a result of the improved situation, the department transferred four areas out of its substantial labor surplus category. Detroit; Kenosha, Wis.; Joliet, Ill.; and the Davenport-Rock Island-Moline area of Iowa and Illinois were moved to a moderate labor surplus classification.

Construction Remains Strong . . .

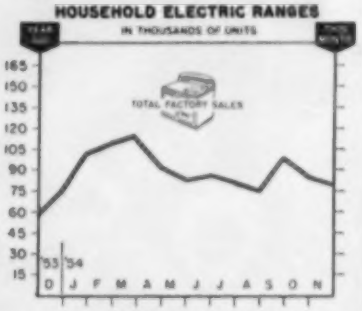
Excellent prospects of the construction industry in 1955 and into 1956 are supported by a record heavy construction backlog of



Total Factory Sales—Units

	1954	1953	1952
Jan.	344,101	325,186	260,259
Feb.	334,122	377,605	259,838
Mar.	330,641	368,498	276,972
Apr.	280,900	366,951	225,994
May	282,164	317,667	217,017
June	303,127	343,114	224,885
July	325,061	298,838	333,877
Aug.	256,665	232,981	250,224
Sept.	271,859	231,224	230,111
Oct.	190,753	179,749	207,065
Nov.	175,557	139,863	256,530
Dec.	.....	197,102	248,506
Total	.....	3,378,478	3,091,434

National Electrical Mfrs. Assn.



Total Factory Sales—Units

	1954	1953	1952
Jan.	101,870	88,145	79,982
Feb.	109,647	114,465	63,063
Mar.	115,393	130,788	93,225
Apr.	96,751	118,999	69,149
May	82,649	114,404	68,117
June	85,854	113,086	86,817
July	80,017	77,836	53,465
Aug.	75,907	74,326	74,853
Sept.	99,611	84,481	62,404
Oct.	84,321	73,422	63,143
Nov.	79,340	65,748	72,982
Dec.	.....	73,870	84,630
Total	.....	1,119,570	901,880

National Electrical Mfrs. Assn.

$79.7 billion, says *Engineering News Record*. Some $5.6 billion of that backlog was added in 1954.

Contract awards slacked off somewhat in the latest week reported, but totals for January are certain to be second highest on record for the month. Indicating that there is plenty of steam left in the construction boom, awards so far in 1955 are 74 per cent over a year ago.

Residential building, too, holds high promise in 1955. The Labor department has already predicted 1,300,000 units. Ewan Clague, special assistant to the Labor secretary, gives some reasons: Record level of consumer disposable income; money is more widely distributed; consumer preference of home ownership; easy credit, especially for veterans; changing population pattern, including bigger families and more single adults and older persons tending to maintain their own households.

New Businesses Increase . . .

New business incorporations in 1954 were highest in eight years, says Dun & Bradstreet Inc. Boosting the year's total to 117,164 was an all-time December record of 11,981 incorporations.

All areas of the country took part in the gain, with the Middle Atlantic, South Atlantic and Pacific states leading in number. But offsetting the high number of incorporations were the number of failures, pegged at 11,086, highest for a year since 1941.

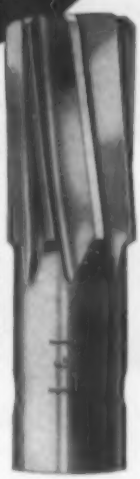
Strangely enough, construction and the service industries last year had the most failures in 21 years. As a whole, those industries did better in 1954 than ever before. The toll among manufacturers was up sharply but still under 1949.

Trends Fore and Aft . . .

Employees who time a strike to cause serious damage to the employer's plant are not entitled to reinstatement, says Court of Appeals for the Fifth Circuit. That decision reversed an NLRB ruling that the employer waived his right to discharge such employees by giving a wrong reason for discharge . . . Department store sales are averaging more than 10 per cent above early 1954 . . . New orders for foundry equipment slumped in November after a short-lived spurt in October, according to Foundry Equipment Manufacturers Association.

NOW

24 hour* delivery on Stub Screw Machine Reamers from .060" thru 1"



L&I, the reamer specialists, now provide another spectacular service for reamer buyers and users—Immediate delivery on Stub Screw Machine Reamers. This offer applies to the first two dozen of your order in each given size reamer.

Ask your L&I distributor for complete details.

Ask him, too, for a copy of L&I's revolutionary new Comparative Net Price Selector covering the most complete line of quality ground reamers available. It's a boon both in buying and in production planning and it's yours for the asking.

If you prefer, write direct to:

L&I

"the reamer specialists"

LAVALLEE & IDE, INC.
CHICOPEE, MASS.

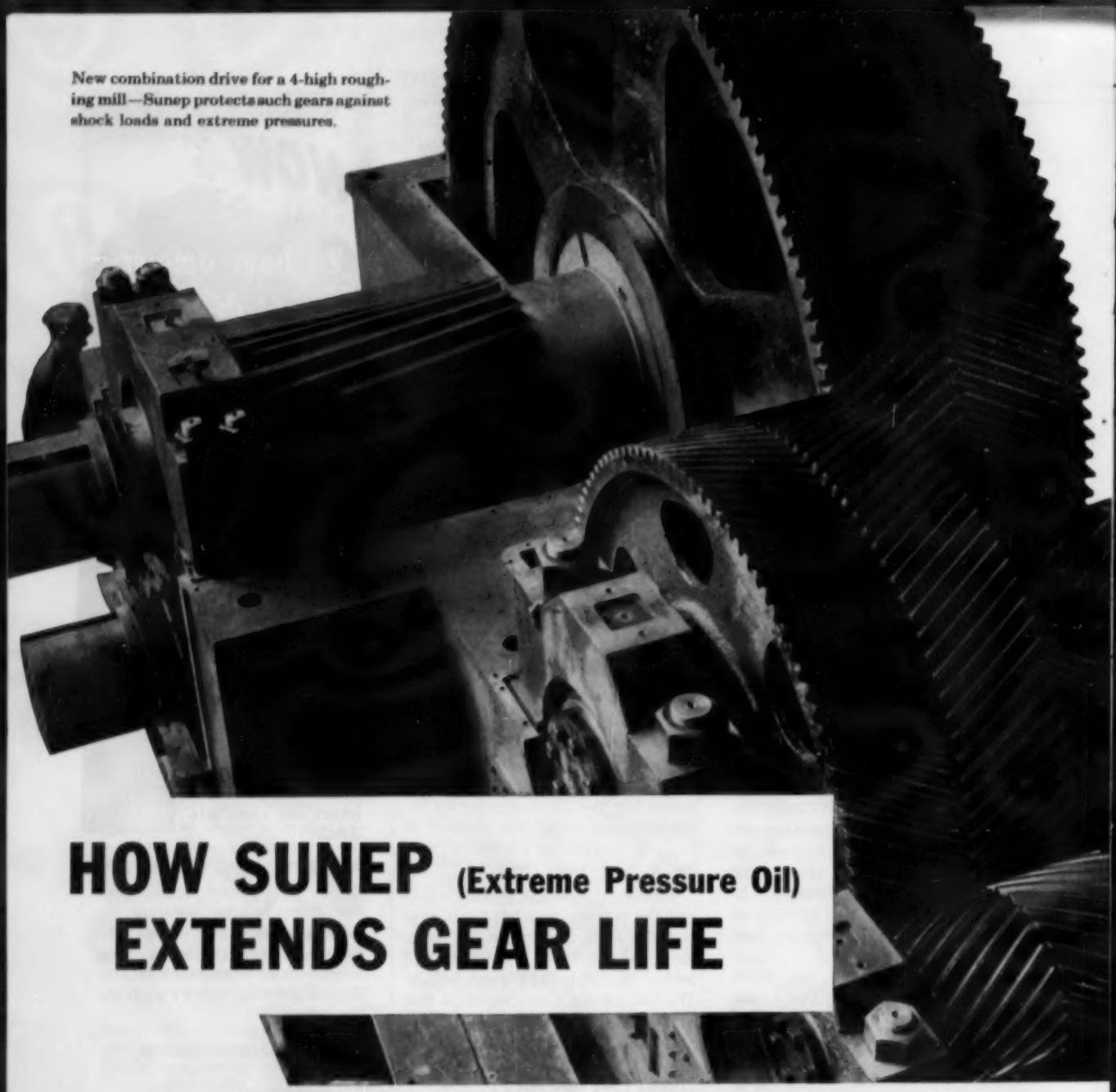
Please send me your new Comparative Net Price Selector.

Name_____

Address _____

City_____ Zone_____

State_____



New combination drive for a 4-high roughing mill—Sunep protects such gears against shock loads and extreme pressures.

HOW SUNEP (Extreme Pressure Oil) EXTENDS GEAR LIFE

The advantage of running your machines at high speeds and under heavy loads can be quickly lost if your extreme pressure lubricants turn thick, lose film strength, or cause gears to corrode.

Sunep gives your gears better protection longer. Unlike many E.P. oils, Sunep is made from highly refined, premium grade oils skillfully blended with chemical additives that do not drop out during operation or in prolonged storage. This accounts for several rare user benefits: long life at extreme pressures; absence of corrosion—even on bronze; rust protection for steel parts; clean gears and bearings as a result of the oil's high stability.

Primarily a lubricant for enclosed gears, Sunep has proven to be highly effective on bearings and screws working under extreme pressures. Because of its exceptional clinging characteristics, Sunep guards against metal-to-metal contact during the early moments of machine operation after shutdown. FREE BULLETIN. Tells all about Sunep. Get your copy. Write Dept. S-1A.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

SUNOCO®

PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

Refiners of famous High-Test Blue Sunoco Gasoline

WALLACE E. ANDERSON
. . . Brown & Sharpe gen. sales mgr.

LEO W. REULAND
. . . Barber-Colman division mgr.

JAMES F. DOHERTY
. . . American Screw v. p.-mfg.

Brown & Sharpe Mfg. Co., Providence, R. I., named **Wallace E. Anderson** general sales manager. He was division superintendent of the Precision Tool & Gage Division. **Paul R. Hatch** resigned as vice president-sales.

Arthur E. Stehle was made national sales manager, **Ettco Tool Co.**, Brooklyn, N. Y. He is replaced as Chicago district sales manager by **Otto Schmidt.**

Robert D. Lawson fills the new position of vice president and sales manager, grinding machine division, **Norton Co.**, Worcester, Mass. He was sales manager.

John T. Wilson was appointed works manager, **Fort Worth Steel & Machinery Co.**, Ft. Worth, Tex. He was formerly plant manager of Webster Mfg. Inc.

Detroit Steel Corp. appointed **A. E. Reinhard** general superintendent of its Portsmouth, O., Division. He recently resigned as assistant general superintendent of Great Lakes Steel Corp., in charge of primary steel production.

William M. Smart was made sales manager, **Congress Drives Division**, Tann Corp., Detroit.

Smith-Gates Corp., Plainville, Conn., elected **Howard C. Smith** vice president.

Barber-Colman Co., Rockford, Ill., made **Leo W. Reuland** division manager of its machine and small tool divisions and its Hendey Machine Division to succeed **Robert A. Horner**, who continues with the company in an advisory capacity. Mr. Reuland served as sales manager and production manager, and has been with the company since 1929.

Francis D. Weeks succeeds **Carl F. Dietz** as president of **Lamson Corp. of Delaware**, Syracuse, N. Y., responsible for general policy administration of the parent company as well as its subsidiaries. Mr. Weeks, who was vice president-treasurer of all companies in the Lamson group, also succeeds Mr. Dietz as chairman of Lamson Mobilift Corp. Mr. Dietz assumes a new post as chairman of Lamson Corp. of Delaware. He will act as consultant, discharging special assignments requested by the board of directors.

A. T. Bard, who resigned as president of Reliance Mfg. Co., was elected president and a director of **Rice-Stix Inc.**, St. Louis. He succeeds **Ernest W. Stix Sr.**, resigned.

Floran L. Meacham, for 16 years associated with General Motors Corp.'s Frigidaire Division, was elected president and general manager of **Simonds Worden White Co.**, Dayton, O.

James F. Doherty was elected vice president-manufacturing, **American Screw Co.**, Willimantic, Conn. He succeeds **George H. Reama**, retiring Feb. 1. Mr. Doherty was manager of the Norristown, Pa., plant and is succeeded by **Jack E. Clark.** He is succeeded as secretary by **Herbert Bromley. John J. Almon** will be assistant secretary.

Chester C. Moss was elected president and general manager, **Walker Mfg. Co.**, Racine, Wis. He succeeds **James S. Allan**, now chairman of the board, acting in an advisory capacity to the firm. Mr. Moss was executive vice president in charge of manufacturing and engineering.

Homer T. Borton, vice president, was elected president of **Osborn Engineering Co.**, Cleveland. He succeeds **James J. La Salvia**, retired. **Noble W. Herzberg** was elected vice president.

William M. Bausch was elected president of **Mill Strip Products Co.**, Evanston, Ill. He also assumes the position of vice president of Korhumel Steel & Aluminum Co., Evanston, parent company. Until recently, Mr. Bausch was vice president-sales, Follansbee Steel Corp. **J. N. Stoutenburg**, formerly Detroit district sales manager for Follansbee, was made a vice president of Mill Strip Products. He

GEORGE E. MERRYWEATHER

CHARLES B. LANSING

CLARE R. KUBIK

. . . new officers at Motch & Merryweather Machinery Co.

continues to be located at Detroit.

Arnaud E. Pausser was appointed manager, sales development at **Hill-Chase & Co. Inc.**, Philadelphia. **Donald MacCallum** was made assistant manager of sales.

Thomas A. Ratkowski was promoted to manager for engineering and development, **American Manganese Steel Division**, American Brake Shoe Co. He has offices at division headquarters, Chicago Heights, Ill.

Chain Belt Co., Milwaukee, appointed **J. N. Tufts** assistant sales manager, Shafer Bearing Division, Downers Grove, Ill. He is succeeded as supervisor of distributor sales by **George Robichaud.**

Reed-Prentice Corp., Worcester, Mass., an affiliate of Package Machinery Co., promoted **Lawrence A. Franks** and **Lebbeus S. Case** to positions of purchasing agent and production planning manager, respectively. Mr. Franks succeeds **Roy P. Harrington**, retired; and Mr. Case succeeds **Victor Rosenlund**, also retired.

Frank M. Cashin, manager of the chemicals division, was advanced to a vice president of **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif.

Edward M. Welty was made Cleveland district manager, **H. M. Harper Co.** He was formerly sales manager of Oliver Iron & Steel Corp.

Motch & Merryweather Machinery Co., Cleveland, elected **George E. Merryweather** chairman of the board and secretary; **Charles B. Lansing**, president; and **Clare R. Kubik**, executive vice president and treasurer. Mr. Merryweather will also serve as chairman of the executive committee. Mr. Lansing, as president, succeeds the late **E. Franklin Motch.** Mr. Kubik was also elected a director.

Robert P. Hartzell was made sales manager, **Alliance Machine Co.**, Alliance, O. He has been supervisor of erection in the field since 1939. **E. L. Elliott** was made chief engineer. **F. K. Tanner** is assistant chief engineer in charge of inspection.

Robert R. Cutler was elected vice president and made central district manager at Cleveland for **H. K. Ferguson Co. C. J. Haglund** was named vice president and manager of the western district office, San Francisco.

H. J. Kennedy was made manager-galvanized ware sales for **Jones & Laughlin Steel Corp.'s** container division, Toledo, O.

R. D. Hill was elected president of **Taylor-Wharton Iron & Steel Co.**, High Bridge, N. J., division of Har-

ROBERT P. HARTZELL

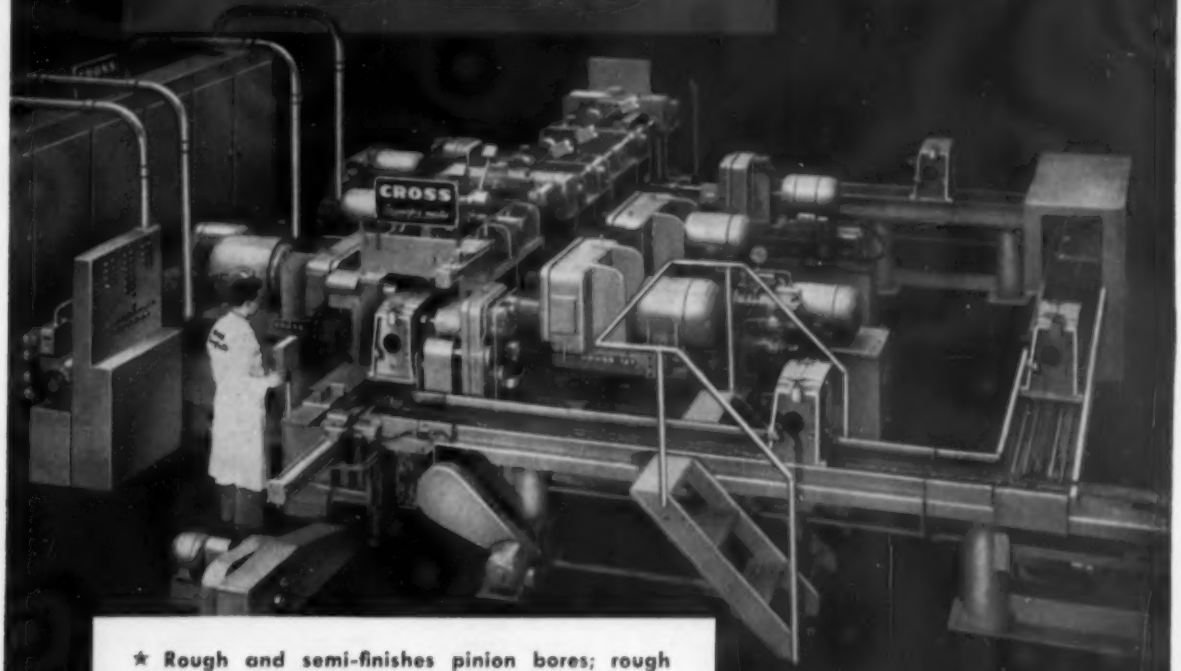
. . . Alliance Machine sales mgr.

R. D. HILL

. . . heads Taylor-Wharton

Another Transfer-matic by Cross

Machines Rear Axle Differential Gear Housings



- ★ Rough and semi-finishes pinion bores; rough bores, semi-finish bores and taps cross bores.
- ★ 155 parts per hour at 100% efficiency.
- ★ 9 stations—1 for loading, 4 for boring, 1 for tapping, 2 for indexing, 1 for visual inspection.
- ★ Pallet-type work holding fixtures.
- ★ Hydraulic power wrench for clamping parts.
- ★ Automatic transfer of fixtures from station to station.
- ★ Other features: Complete interchangeability of all standard and special parts for easy maintenance; construction to J.I.C. standards; hardened and ground ways; tandem drive for locating pins; hydraulic feed and rapid traverse; automatic lubrication; oil-mist lubrication for taps; drag-chain type chip conveyor.

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

GLENN P. BAKKEN
. . . Chase Brass executive v. p.

GEORGE R. WALKER
. . . Mullins Mfg. dir.-purchases

DAVID A. WALLACE
. . . Cincinnati Lathe & Tool sales mgr.

risburg Steel Corp. He was executive vice president.

Glenn P. Bakken was elected executive vice president and a director of **Chase Brass & Copper Co. Inc.**, Waterbury, Conn., a subsidiary of Kennecott Copper Corp. He has been plant manager at Phoenix, Ariz., for Reynolds Metals Co.

William Swicker was named president of **Mutual Steel Construction Inc.**, newly organized Los Angeles structural steel construction firm.

Charles W. Hunter joins **A. W. Hecker Co.**, Cleveland, to direct sales activities of its aircraft parts production division. He was factory manager in the aircraft division of Hudson Motor Car Co.

Turco Products Inc., Los Angeles, appointed **Archie K. Beard** manager of its metal processing division and eastern divisional manager of its new Chem-Mill Division. He will have headquarters at Turco's eastern plant in Newark, N. J.

George R. Walker was named director of purchases, **Mullins Mfg. Corp.**, Salem, O. Formerly with American Motors Corp. and Hudson Motor Car Co., where he was assistant director of purchases, Mr. Walker succeeds the late **James W. Farrell.**

Paul J. Krause was elected vice president of the newly incorporated **Harruff Welding Corp.**, Toledo, O. He recently resigned as manager of sales service for U. S. Steel Supply Division, U. S. Steel Corp.

Arthur P. Hickcox, vice president, was made general manager of **Scovill Mfg. Co.'s** main plant operations at Waterbury, Conn. He is succeeded as director of purchasing by **Lewis F. Cobb.**

Thomas M. Owsley Jr. was appointed blast furnace superintendent at **Globe Iron Co.**, Jackson, O.

Levinson Steel Co., Pittsburgh, appointed **James C. Levinson** assistant sales manager, fabrication.

David A. Wallace was appointed sales manager of **Cincinnati Lathe & Tool Co.**, Cincinnati. He was made assistant sales manager in 1951.

At the Warren, O., district steel plants of **Republic Steel Corp.**, **Fred S. Ebinger** was made assistant superintendent, mechanical department; and **William J. Shand** was made assistant superintendent, hot-strip finishing department. Mr. Ebinger succeeds **Calvin H. Windle**, recently named cold-strip superintendent. Mr. Shand succeeds **R. C. Boles**, assigned other duties.

S. H. Lefton, former sales manager, International Rolling Mill Products Corp., was made general manager of **Nottingham Steel Co.'s** Chicago warehouse.

David P. Finney was appointed general superintendent of **U. S. Steel Corp.'s** Clairton, Pa., Works, and **Frederick A. Dudderar** was made assistant general superintendent. Mr. Finney succeeds **H. W. Seyler.**

OBITUARIES . . .

Milton J. Karp, 60, president, **Karp Metal Products Co.**, Brooklyn, N. Y., died Jan. 17.

Sam Stern, 56, founder and president, **Action Diamond Tool Co. Inc.**, Chicago, died Jan. 16.

Henry J. Mittelstaedt, sales manager of **Hanna Furnace Corp.**, Buffalo, a subsidiary of National Steel Corp., died Jan. 16.

Donald F. Grace, 52, vice president and secretary of **Chicago Steel Service Co.**, Chicago, died Jan. 2.

Stanley D. Gralak, 42, supervisor of stress analysis, **Deere & Co.**, Moline, Ill., died Jan. 7.

Frank Travis Sr., owner of **C. W. Travis Sons Foundry**, Athens, N. Y., died Jan. 10.

Ralph H. John, 58, chief engineer, **Chevrolet-Saginaw Gray Iron Foundry Division**, General Motors Corp., Waukegan, Ill., died Jan. 12.

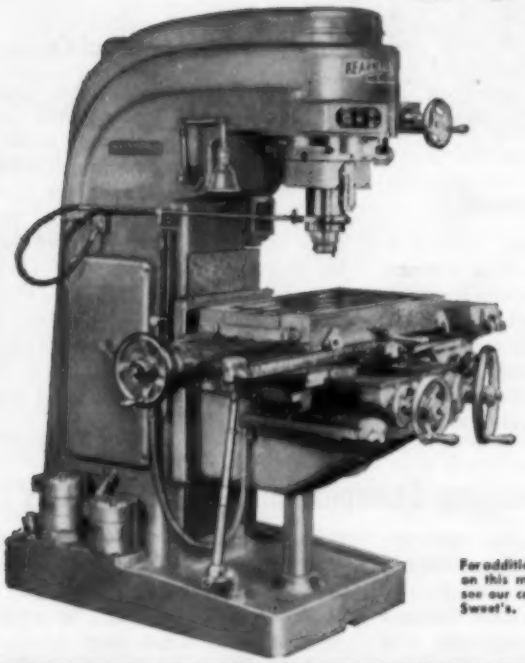
T. Clarence Wilkins, 60, assistant sales manager, **American Brass Co.**, Waterbury, Conn., died Jan. 11.

FOR RENT: one new machine. COST: only 44 cents per hour

that's all you pay for this new Model 2D Rotary Head milling machine when put to work in your plant with...

Kearney & Trecker

TOOL-LEASE PROGRAM



For additional data on this machine, see our catalog in Sweet's.

THIS new Model 2D Rotary Head milling machine costs you *only 44 cents per hour* . . . in operation in your plant. It's amazing. But under Kearney & Trecker's Tool-Lease Plan "A," one of three possible lease agreements, you make two semi-annual payments, totaling 25% of the machine's price during each of the first three years. And only 10% during each of the last four years.

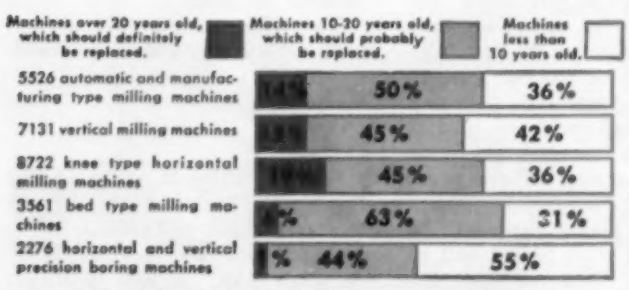
What's more, you benefit from Model 2D's many time-saving operating features. The Rotary Head design assures greater accuracy and savings because you can do precision boring, drilling, slotting and milling of circular and angular cuts in both horizontal and vertical planes — without changing the setup.

Under Tool-Lease you can rent any of over 250 different types and sizes of standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

For complete information on Tool-Lease, see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

MACHINE TOOL OBSOLESCENCE IS BECOMING CRITICAL! WHERE DO YOU STAND?

Shipbuilding, Ordnance and Miscellaneous Industry — Includes machines for shipbuilding; forgings; foundry machine shops; die casting; pipe fabrication; ordnance, including atomic energy, small arms, guns, gun carriages, ammo, fuses, explosives, fire-control instruments, tanks; steam engines, turbines and waterwheels. Of the total 27,216 machines, 12% are over 20 years old and over 48% are 10-20 years old!



Figures adapted from 1953 American Machinist survey of Metalworking Industry.

KEARNEY & TRECKER CORP.
6784 W. National Ave., Milwaukee 14, Wis.

Please send me Bulletin TL-10A on Tool-Lease Program and booklet titled "Critical Picture of Creeping Obsolescence."

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

Carborundum Buys Curtis

Move will provide better abrasive belt machines and abrasive belts for industry

CARBORUNDUM CO., Niagara Falls, N. Y., acquired Curtis Machine Corp., a subsidiary of Lincoln Park Industries Inc., Lincoln Park, Mich. Curtis, operating a plant in Jamestown, N. Y., pioneered in the manufacture of belt sanders and rubbing machinery for the furniture industry. The company has developed many new machines in recent years and introduced the principle of abrasive belt grinding in the metal industry.

Gene DeMambro, president and general manager of Curtis Machine, will continue in that capacity, reporting to W. H. Wendel, vice president in charge of Carborundum's Coated Abrasives Division in Wheatfield, N. Y.

Coated Abrasives — Carborundum Co., producer of abrasive crudes, grains and grinding wheels, has a division devoted exclusively to the manufacture of coated abrasives. The Coated Abrasives Division's new plant in Wheatfield, N. Y., produces over 20,000 standard sizes, kind and shapes of coated abrasives each year. Abrasive belts are the fastest-growing large-volume segment of the coated abrasive business.

Uses of abrasive belts have multiplied so rapidly many industrial plants are unable to keep abreast of developments. To help meet this need, Carborundum built a mobile abrasive workshop and equipped it with modern abrasive belt machines. This traveling unit goes to customers' plants and demonstrates the latest abrasive belts and belt machines.

New Division—The parent company also has established an Electro Minerals Division to manufacture and sell silicon and fused alumina crudes, abrasive grain and related electric furnace products. Carborundum's Bonded Products & Grain Division, which formerly encompassed the responsibilities now allocated to the new division, is designated the Bonded Abrasives Division and will specialize in the manufacture of grinding wheels, sharpening stones and other bonded abrasives.

Joseph S. Imirie, formerly assistant to the president, is general manager of Electro Minerals Division. Other assignments are: G. R. Rayner Jr., sales manager; D. G. Vanderhoek, manufacturing manager; J. J. Forrester, manager of product engineering; H. L. Schmidt, works manager of the division's Niagara Falls plants; E. E. Howard, manager of the Vancouver plant.

Jorgensen Buys Warehouse

Earle M. Jorgensen Co., Los Angeles, distributor of steel and aluminum products, purchased the entire warehousing operation of Tayler & Spotswood Co., San Francisco.

Die Casting Plant Opened

Lester Castings Inc. opened a new plant at the corner of Cannon and Aurora roads, Bedford Heights, O. Production equipment includes aluminum and zinc die casting machinery (ranging in capacity from 150 to 600 tons of pressure) and completely equipped and modernized tool and die sections. The finishing and assembly rooms are equipped for trimming, drilling, reaming, tapping and other operations essential to the completion of die cast parts.

Shell Castings Inc. Formed

Shell Castings Inc. designates a newly formed group of foundries devoted to the production of castings in magnesium, aluminum, copper, bronzes, brasses, cast iron and all alloys of steel. Address of the organization is P. O. Box 782, Erie, Pa.

Buys Fray Machine Tool Co.

U. S. Industries Inc., New York, purchased Fray Machine Tool Co., Burbank, Calif., maker of milling machines, milling machine heads and offset boring heads for toolroom and production use. The Fray operation is being moved into the Vernon, Calif., plant of U. S. Industries' Axelson Mfg. Co. Division, which already has a line of engine lathes. No additional equipment will be required to manufacture the Fray line of machines.

Eaton Mfg. Expanding Stamping and Axle Divisions

EATON MFG. CO. acquired the plant and office of Bryant Heater Division of Affiliated Gas Equipment Inc., all of Cleveland. Eaton's Stamping Division personnel and facilities will be moved to the Bryant Heater plant at 17877 St. Clair Ave., while its Axle Division will utilize the floor area of the present stamping plant at 755 E. 140th St., Cleveland.

Stamping Facilities—As a result of this acquisition, Eaton will increase its Stamping Division's manufacturing floor space by 40 per cent. The Bryant plant will be increased by an additional 15,000 sq ft to house the new fully automatic nickel-chrome plating unit. New press and polishing equipment also will be added. Manufacturing capacity for present major Stamping Division products will be expanded, quality standards on plated parts will be improved and plant layout will be revamped to facilitate materials handling.

Possession of the title will be acquired on Mar. 1. Complete possession will come on Apr. 1. Full operation should be under way not later than Aug. 1.

Axle Division—The Axle Division's floor space will be increased by 20 per cent when the 120,000 sq ft now occupied by the Stamping Division plant is utilized. Floor area of the replacement parts department of the Axle Division will be tripled. This enlargement permits bin space for a larger parts inventory and an improvement in packing facilities.

The axle experimental department will be expanded to more thoroughly test truck axles. Dynamometers, furnished by Eaton's Dynamatic Division, will cost $175,000.

General offices of Affiliated Gas Equipment Inc. and the Bryant Heater Division will remain in the building now occupied at 17825 St. Clair Ave. It will be leased from Eaton Mfg. Co.

Pelton Steel Buys Foundry

Pelton Steel Casting Co., Milwaukee, through its newly formed subsidiary, Pacific Alloy Engineering Corp., purchased the stainless alloy foundry of Solar Aircraft Co., San Diego, Calif. Solar retains a minor interest in the new concern. The foundry is being moved from San Diego to El Cajon, Calif. A. M. Slichter, Pelton's president, is also president of Pacific Alloy; W. H. Dunn, head of Solar foundry operations, is vice president.

Opens Aluminum Molding Plant

B & T Metals Co., Columbus, O., opened a 40,000-sq-ft plant in Los Angeles for production of extruded aluminum moldings.

Battelle Institute Expands

Facilities to accommodate an expanded program of pilot-plant and large-scale research for industry are nearing completion at Battelle Memorial Institute's property just outside Columbus, O. They will be used primarily for large-scale studies in metallurgy, minerals processing and chemical engineering. Provided initially in the $300,000 construction program are two major buildings, (totaling 13,000 sq ft) which are designed for large-scale experimental work. Additional buildings are contemplated.

Among the equipment being installed is a 500-kva, 3-phase transformer, equipped with automatic controls, which can be used with a 1000-lb melting furnace or for studies of continuous smelting.

The new construction at the West Jefferson, O., site is in addition to the institute's recently announced $1.5-million program for the establishment of facilities for the study of peacetime applications of nuclear energy.

Brown & Sharpe Sells Line

Brown & Sharpe Mfg. Co., Providence, R. I., sold its hob business to Barber-Colman Co., Rockford, Ill. Included in the sale were the machines and tools used in the manufacture of hobs formerly listed in the Brown & Sharpe catalog. The manufacturing equipment is being moved to the Barber-Colman plant in Rockford where it will augment the latter's hob manufacturing facilities.

Steel Moves From New Dock

Granite City Steel Co., Granite City, Ill., is shipping steel and receiving raw materials at a harbor and dock on the Chain of Rocks canal of the Mississippi river. The company has leased 400 ft of a 600-ft dock which is 1.6 miles from the mill. The dock is being developed by Missouri-Illinois Bi-State Development Agency. The company previously trucked steel to St. Louis or East St. Louis for loading into barges at those points. The initial shipment consisted of slabs destined for a steel mill in Holland. Granite City Steel expects to move hundreds of thousands of tons of scrap steel, coal, ferrous products, fluorspar, fuel oil and such heavy equipment as ingot molds from the new dock.

Atomic Reactors for Sale

GE has developed a low-power atomic research reactor for industrial and educational use. In the core (shown above) neutrons are hurled against test materials at 1-mile-per-second speeds. They are "slowed" to this speed by about 12,000 lb of graphite surrounding the core when it is in operation. Materials to be tested are guided into the core by the long tube

REPRESENTATIVES

Republic Steel Corp.'s Berger Mfg. Division, Canton, O., appointed Herco Pipe & Supply Co., South Gate, Calif., distributor of Republic's steel kitchens in Southern California south of the Kern county line and in Clark county, Nevada.

Wiretex Mfg. Co., Bridgeport, Conn., appointed Noble Equipment Co., La Grange, O., as its agent for Ohio, except the Cincinnati and Youngstown areas. The distributor handles the Dispatch furnace line as well as the Wiretex line of wire baskets.

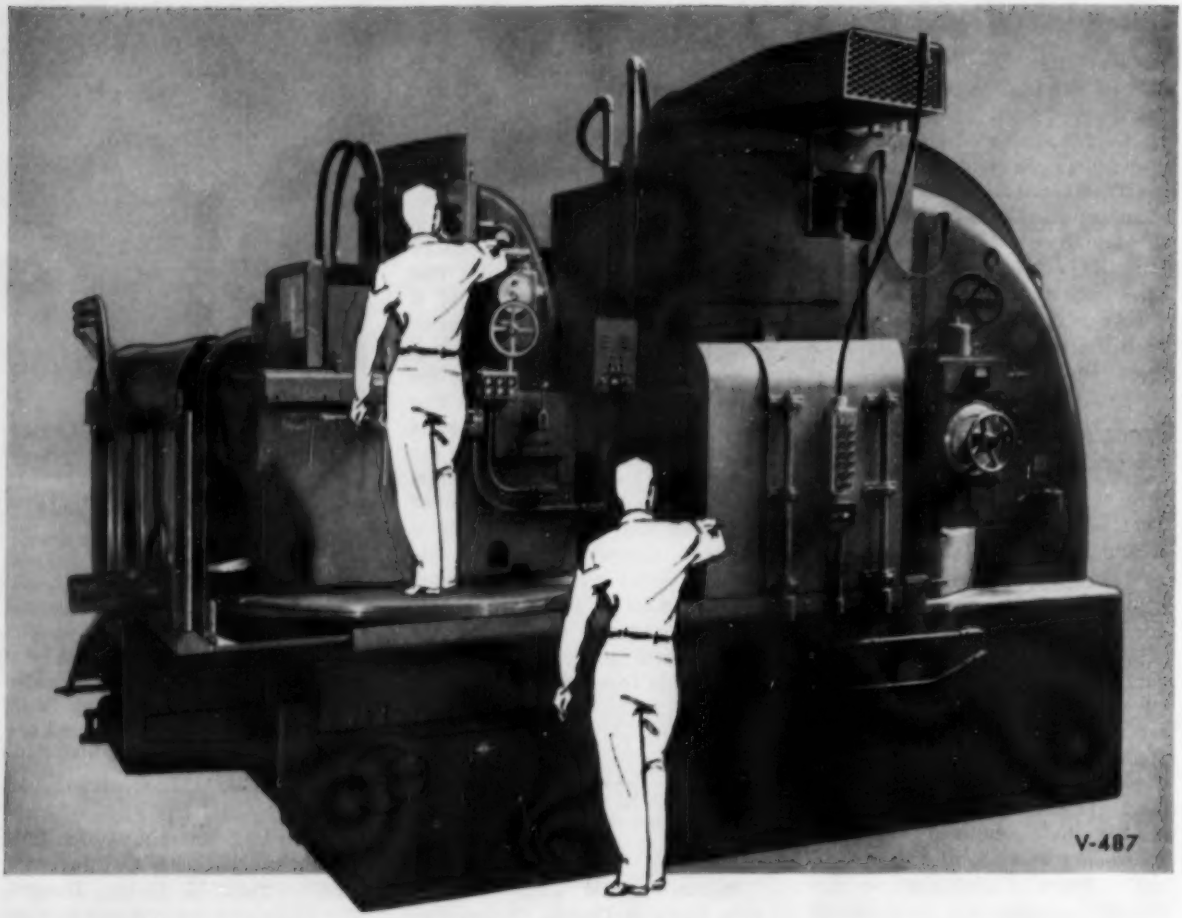
American SIP Corp., New York, the United States distributor of the SIP jig borers and high-precision measuring equipment, appointed Overgard Machine Tool Co., Denver, representative in Colorado and Utah for all SIP standard products.

Forker Corp., Cleveland, appointed the following distributors for its Ohio tramrail systems: American Equipment Co. Inc., Milwaukee; E. I. Knorring & Co., Chicago; Fred Thrasher Co., Jackson, Miss.; Urban M. Lodge, Denver. The Ohio tramrail systems line includes complete tramrail track layouts, tramrail cranes, transfer bridges, jib and gantry cranes, safety-type shielded electrification for electrical hoists, motor-driven trolleys and crane end-trucks.

New Wrinkle Inc., Dayton, O., appointed Davis & Davis, Chicago, as manufacturer's representative serving the area on matters dealing with the use and sale of Wrinkle vehicles in patented Wrinkle finishes.

Mercury Mfg. Co., Chicago, appointed J. Ford McGowan representative in New England to handle the Mercury line of fork trucks and industrial tractors and trailers.

Pennsylvania Transformer Co., Canonsburg, Pa., appointed Williams & McKinley Sales Co., Kansas City, Mo., and Deco Engineering Products, Des Moines, Iowa, as representatives in their respective areas.



WE PUT ONE BLANCHARD ON ANOTHER

. . . to show you the wide range of sizes!

It's true! There's no "trick" photography involved. Our 5,400-lb. No. 11 Blanchard Surface Grinder fits snugly on the 84" chuck of our giant 61,000-lb. No. 42-84. And, like all Blanchards, both have chucks flat within .0002"—guaranteed!

Do every surface grinding job in your shop *perfectly* . . . whether you grind tiny watch parts—steel plates 7 feet across corners—or anything in between . . . *put it on a Blanchard.*

Whatever your requirements for stock removal, tolerances or surface finish, ask for details on the 15 standard Blanchard models today. One of them will fill your needs perfectly and will do your work with speed and precision—at costs which help you set competitive prices.

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "The Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

Technical Outlook

MORE HEAT— Air Force researchers say that a new high-temperature material may result from the bonding of silicon carbide with a metal or alloy to give a dense cermet. Although work is still in the investigation stage, its results indicate iron and a mixture of chromium and molybdenum to be the most promising bonding materials.

FLEX TEST— The average fuel pump diaphragm flexes some 2000 times a minute. AC Spark Plug Division, General Motors, however, is making a diaphragm that will flex many times more. It is made from a fabric designed to operate at both extremes of the temperature scale.

TOOL WEAR— The Government is using tracer radioisotopes to measure rates of wear on a tool point. The work is being done at the Rock Island Arsenal. Tools are irradiated at the Oak Ridge National Laboratory. Radioactivity transferred from the tools to the resulting chips is the basis for life analysis.

MAGNESIUM PLATE— Dow Chemical Co. will show plate magnesium for tooling applications at the ASTE Western Industrial Exposition in Los Angeles next March. It'll be the first public showing of the plate which varies from ¼ to 3 in. thick, up to 6 ft wide and 24 ft long.

NEW SILICONE LUBRICANT— By modifying the rugged silicone oil molecule, Westinghouse materials engineers have come up with a lubricant that is outstanding in both thermal and load bearing properties. The fluid has satisfactorily passed thermal stability and viscometric tests ranging from −65°F to 500°F. Steel-to-steel bearing load tests have shown excellent lubricating qualities up to 107,000 lb per square inch of bearing area. Dow Corning is manufacturing the lubricant.

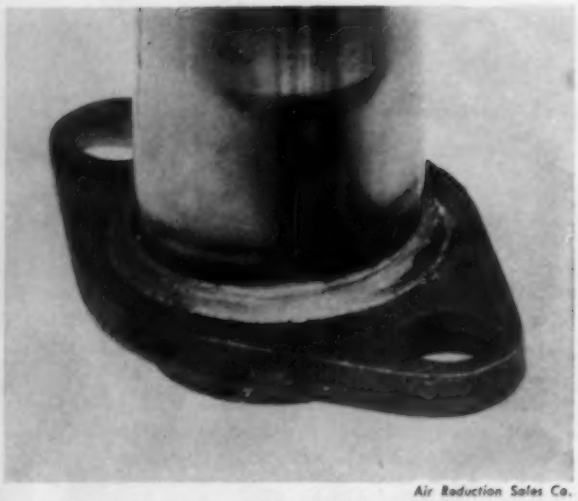
HELP— To speed development of titanium technology, U. S. Dept. of Commerce's Office of Technical Services is making available to industry a reference work on the characteristics of some 70 titanium alloy systems, including crystal structures. The phase diagrams will be especially valuable in titanium alloy production and heat treatment.

TESTING THE TESTERS— What kind of material do you use in testing devices that evaluate the high-temperature metals? On-the-job results using grade 608 chrome carbide promise to soothe that headache. GE's Carboloy department report that this material is working well as sample grips for rupture and tensile tests, for anvil and Brale extensions in hardness testing and as Brinell balls in hardness evaluations. Material has a transverse rupture strength of 120,000 psi at 1500°F, 100,000 psi at 1800°F.

EXAMINED— X-ray diffraction, stripping and salt spray corrosion are being used by researchers at U. S. Arsenal, Rock Island to investigate stability of zinc phosphate coatings on steel at high temperatures. Study was started because of the practice of painting over the phosphated surface and drying under infrared light and in bake ovens.

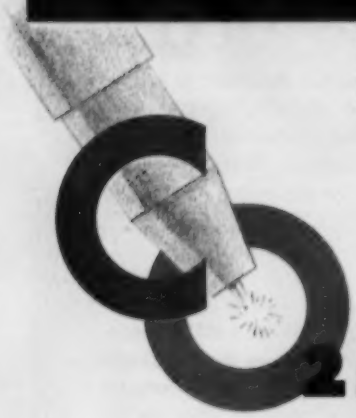
LONGER LIFE— An auto manufacturer has upped production of a hand brake part by more than 500 per cent by flame plating the die with tungsten carbide. Plated die turns out 250,000 parts compared with 40,000 for unplated one.

Metalworking Outlook—p. 31 *Market Outlook—p. 97*



Air Reduction Sales Co.

Two auto industry applications where 100 per cent CO_2 shielded welds are making good are this differential housing and the exhaust crossover pipe and flange assemblies. Gas flow of 40 cfh, 24 volts and 200 amp were used on the latter



CO_2 Means Cheaper Gas-Shielded Welds

When you can substitute low-cost carbon dioxide for helium or argon you can cut costs at least 70 per cent. That's why welding engineers are happy for the future

By THOMAS F. HRUBY
Associate Editor

THE FIZZ that puts life into your highball seems destined to do the same thing for the welding industry.

Researchers have found a way to put carbon dioxide to work as a replacement for the relatively expensive argon and helium-shielding gases. To the welding engineer, this development looks like the real door opener for the inert-gas processes.

Here's Why—Take a hypothetical example—welding mild steel using the metal inert-gas process. Gas consumption might be in the neighborhood of 30 to 40 cu ft per hour. At roughly 10 cents a foot for argon, gas costs alone would be $3 or $4 per operating hour.

On a straight substitution basis, CO_2 at about a penny a foot would make the gas bill about one-tenth that for the same operating hour. And in production tests, it has been found that a considerably smaller volume of CO_2 will give the same effective shielding.

Who's Doing It?—Three companies have taken the lead in CO_2 welding research—General Electric, Air Reduction Sales and Liquid Carbonic Corp. The first two have largely concentrated their efforts on 100-per-cent-use of CO_2 as a shielding gas in the metal inert-gas processes. Liquid Carbonic has limited its efforts to the tungsten inert-gas process, using both CO_2 and argon in concentric shielding of the arc and weld area.

Both approaches have commercial merit. Straight substitution of CO_2 for argon in both processes lends itself to fast inexpensive welding of mild carbon steels. But since CO_2 dissociates in the

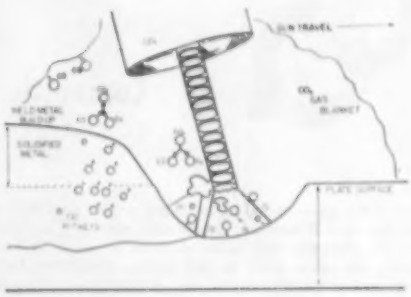
CO_2

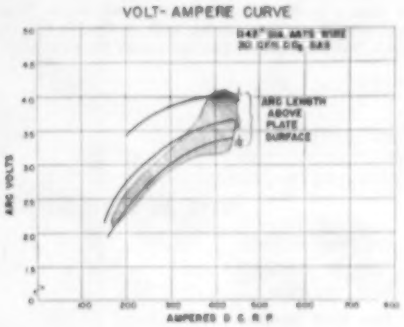
Straight Substitution Results

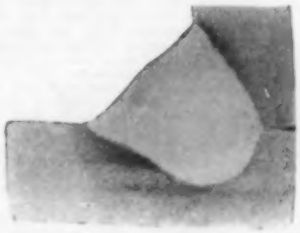
UNLIKE argon or helium, carbon dioxide is not an inert gas and will break down into CO and O_2 in the intense heat of the arc. The enclosed sketch shows that reaction, but it also shows the reaction reversing itself as the temperature drops to 634° C.

In the consumable-electrode gas-shielded process it has been proved that all known arcs in inert gases have rising volt-ampere characteristics. Carbon dioxide is no exception as the curve demonstrates. The generator that best matches these volt-ampere curves will produce welds with the same arc length and do it automatically under different current requirements.

Extremely deep-penetrating arc and porosity-free welds can be expected from the process, as the section views illustrate. Both were made on ¼-in. mild steel with no edge preparation. Arc length for the butt weld was 1/16-in.; and ⅛-in. for the fillet weld.







620 amp-40 arc V-fillet weld on semi-killed steel CO_2 gas—30 cu ft/hr

470 amp-37 arc V-butt weld on semikilled steel with no edge preparation CO_2 gas—30 cu ft/hr

General Electric Co.

heat of the arc, alloying elements in stainless and alloy steels tend to oxidize. With the concentric-shielding method, however, a small volume of argon is used to protect the tungsten electrode and a larger volume of CO_2 around it completes the shielding. This technique can be and is being used successfully on stainless alloys and mild steel.

Closer Look—Welding experts at General Electric have discovered that CO_2-shielded arcs have the same rising volt-ampere characteristics as their argon counterparts. To reduce the effects of spatter and to reduce porosity, a short arc is vital. The electrode tip should operate near or even below the surface of the plate, so that the majority of electrode droplets, which would ordinarily produce spatter with a long arc, are deposited in the weld puddle.

The CO_2-shielded arc produces more heat than argon-oxygen because the practical welding current and arc-voltage range are higher. This extra-high heat gives an inherently deeply penetrating arc. Current density, too, must be closely controlled and values held high. To achieve an electrode burn off of 520 ipm of 3/64-in. steel wire in argon takes only 280 amp, but the same burn off in CO_2 would take 350 amp.

Less Porosity?—GE researchers believe that the main source of porosity in welding mild carbon steel is the combination of carbon with oxides already in the base metal. Even though it is not soluble in the molten metal, the carbon monoxide formed tends to become trapped by the freezing metal before the gas escape.

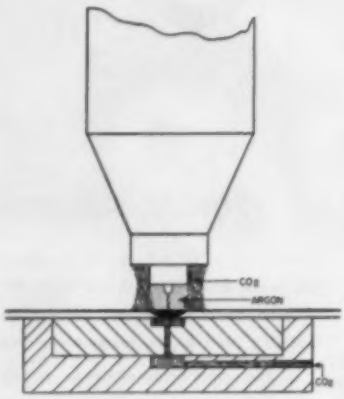
It is their contention that the

Concentric Shielding Results

WITHOUT the inner shielding of argon gas immediately around the tungsten electrode, two things would happen: Dissociated oxygen from the CO_2 would cause rapid burn off of the electrode and some alloying elements in the steel would tend to oxidize. However, the latter can't be too serious a problem because use of CO_2 as a backup gas, as shown in the sketch, has proved highly successful.

Concentric shielding, used with a wide variety of stainless and alloy steels, has produced welds of excellent quality. Aside from an almost imperceptibly light scale in the weld area (it can be readily cleaned off) there is no visible difference between straight-argon and argon-CO_2 welds.

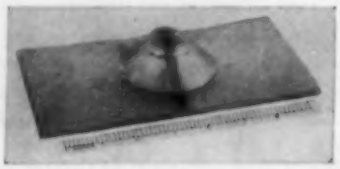
Test results verify the soundness of the welds themselves. They were checked for porosity, slag inclusions, cracks, lack of fusion, gas pockets, blowholes and tungsten inclusions. Standard procedures were used for bend and tensile tests.



TESTS ON FOUR SAMPLES TYPE 321

WELDING METHOD	T.I.G.			
TYPE OF WELDING	AUTOMATIC HELIARC			
TYPE OF WELD	BUTT			
Test Weld Number	35	37	38	39
Metal Thickness	.050	.050	.050	.050
Backup Gas Used	Argon	CO_2	CO_2	CO_2
Backup Gas Flow (cfh)	4 to 5	4 to 5	4 to 5	4 to 5
Wire Feed (ipm) Approx.	22	22	22	22
Wire Size	.064	.064	.064	.064
Torch Travel (ipm)	11	11	11	11
Torch-shield Gas	Argon	Argon	Argon	Argon
	CO_2	CO_2	CO_2	CO_2
Torch-shield Gas Flow (cfh)	20	20	20	20
	30	25	20	15
X-Ray Analysis	RA*	RA	RA	RA
Bend Test	S*	S	S	S
Tensile Pull (lb)	4100	4250	4200	4225
Tensile Strength (psi)	82,000	85,000	84,000	84,500
Type of Break	J*	J	J	J

*RA Radiographically acceptable
*S Satisfactory
*J Break at junction of weld



STANDARD CUP TEST
(Stainless Steel)

The above test was designed to measure the physical quality of a weld. No finishing of any type is applied to the weld before testing. The sample is placed into the testing apparatus where it is subjected to a measured pressure. The pressure is transferred to the weld area by means of a hydraulic ram and steel ball arrangement.

An acceptable weld should produce a fracture running 90 degrees to the weld bead axis and the fracture should cross through the weld itself.

The above weld was made using a hand held Tungsten-Inert Gas torch with a carbon dioxide back-up gas. Ram pressure was applied against the weld face and produced the above type fracture.

The Liquid Carbonic Corp.

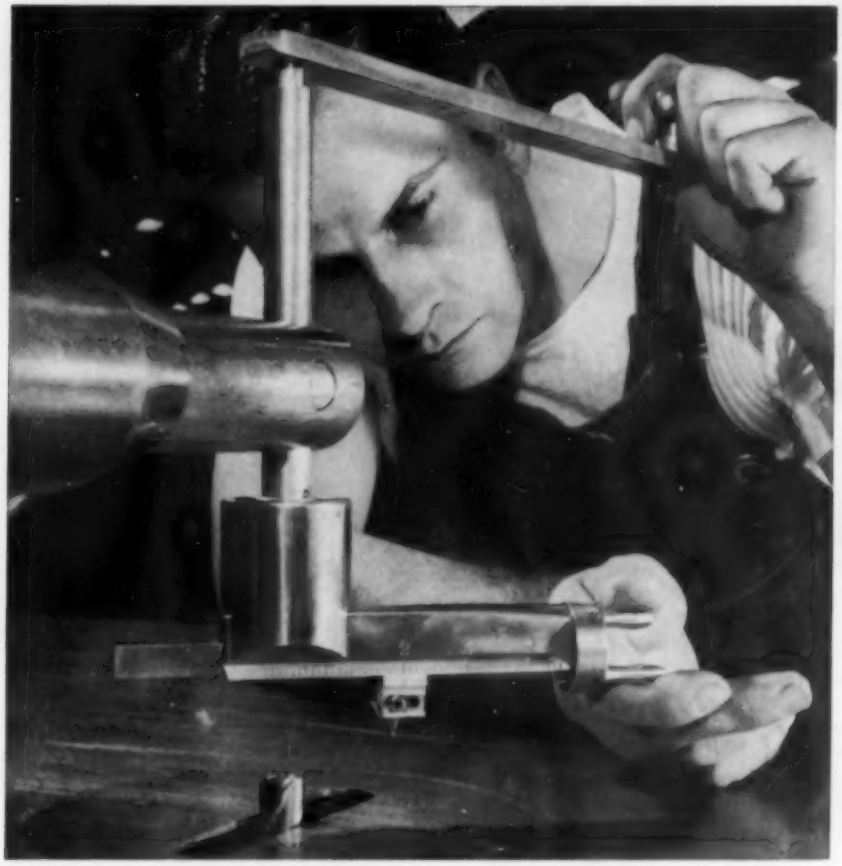
higher current densities employed in carbon-dioxide welding—involving super heating of the weld metal and violent agitation of the molten pool—tend to permit more carbon monoxide to escape. For this reason the method may be more effective in reducing porosity than other inert-gas mediums.

Tungsten Inert-Gas Shielding—In an attempt to reduce inert-gas welding costs while still preserving desirable features of the process, both Liquid Carbonic and Airco have investigated the use of dual-gas shielding. While much of their activity is centered on tungsten inert-gas welding, both concede that the idea is feasible for use in metallic-arc processes as well.

In present practice, standard tungsten inert-gas torches are fitted with an external secondary nozzle which distributes a curtain of CO_2 gas around the inner argon-shielding nozzle. With this arrangement, only about a third as much argon is needed per unit of weld time. Other things being equal, this translates into a better than 60-per-cent cost saving over 100-per-cent argon usage, with no sacrifice in weld quality (see the above test results).

Toxic Troubles—A logical question might be: What about the effects of CO and CO_2 on welding operators? Tests showed that with a 30 cu ft per hour gas flow, only about ½ cu ft of free CO is liberated. To keep below established concentration limits for both CO and CO_2 when welding on a continuous basis, a room 20 x 20 x 12½ ft would need an air-change rate of 100 cu ft per minute. This compares to the ASA recommendation of 2000 cu ft per minute which would ordinarily be in force.

The operator should not be located so that smoke and hot gas rising from the arc impinges on his face. In some applications where arcs may generate large amounts of ozone, ventilation in excess of the standard may be required.



Tapered point takes the workpiece around the cutter as the operator rotates a crank. Accurate guide eliminates finishing operations as it cuts hole to specified size

Router Guide Cuts Job Time

A QUICK-SET guide is saving an average of 15 minutes per piece in routing holes in router template blocks.

Designed and built at Temco Aircraft Corp., Dallas, the guide is so accurate that no sanding or filing of the hole is required to reach final size. The only reference mark needed by the guide is the conventional pilot hole.

Reverse—The guide's most unusual characteristic is that it rotates the form block around the stationary router blade to make the hole. Normally, the cutter moves and the block remains stationary.

This reversal of customary procedure is reported to give the new guide its impressive accuracy. Measurements taken from the stationary router blade to a tapered point, which rests in the template's pilot hole, are much more accurate than those possible with a fly-cutter.

Used on an Onarud tilting-arbor router, the attachment consists of a 9-in. vertical shaft which is held by the screw-type guide head, a 13-in. crank attached to the top of the shaft and a 6-in. track attached to the bottom of the shaft.

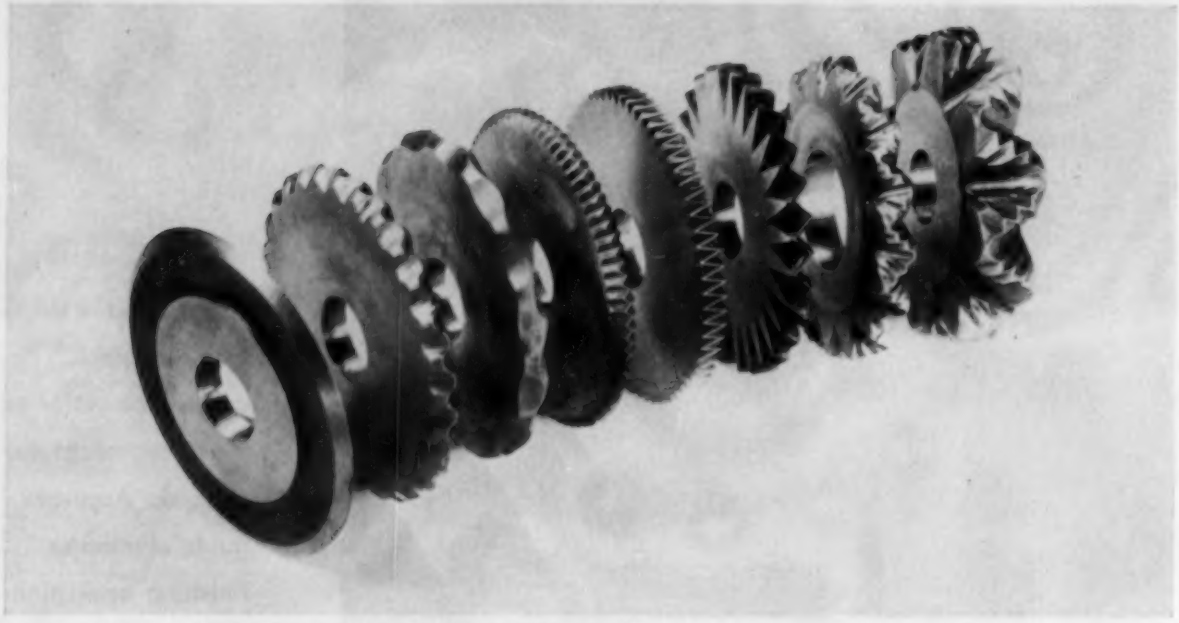
Setup — A tapered point travels along this track on a screw traverse. A 6-in. scale on one side of the track is graduated in tenths of an inch. A circular scale at one end of the track is graduated in thousandths.

To set up for routing a hole with a 2-in. radius, the operator first lines up the tapered point with the 2-in. marker on the scale. This means the point is precisely 2 in. from the back side of the router blade. Thousandths can be added to (or subtracted from) the setting by using the circular scale.

Once the point is properly positioned, it is lowered into the pilot hole of the template to be routed, where it automatically centers. One counterclockwise revolution of the crank revolves the template in a perfect circle over the router blade. The cut is so exact that no sanding is necessary.

Holes were formerly cut to within 1/16-in. of the desired diameter with a fly-cutter. The remaining material then was removed with a sanding drum and a half-round file. The sequence frequently took 30 to 60 minutes per hole.

No. 12 in STEEL'S MODERN HEAT TREATING SERIES



These pinking and slitting cutters work against a hardened steel platen. They are water hardening tool steel heat treated to Rc 60 to 62. Treated in batches of 100 pieces, breaking and cracking was a problem before switch to a tough timbre tool steel was made to give an extra factor of safety in quenching

HEAT TREATING TOOL STEELS

Water Hardening Types

This is the second in a series of five articles on heat treating tool steels by Messrs. Manley and Brumbach. First, Jan. 24, covered fundamentals of treating the water hardening types. In succeeding issues the authors will discuss: Oil and air hardening types, hot work and high speed tool steels.

QUENCHING A TOOL during heat treatment takes place in three stages.

First comes the vapor blanket portion. A thin vapor film surrounds the hot metal. Since heat transfer is by conduction and radiation through this film, cooling is relatively slow.

End of this stage is marked by wetting of the metal surface. Since vapor forms in bubbles and is carried away by convection currents to condense in the cooler surrounding liquid, this vapor transport stage is a fast cooling one.

As the surface temperature of the metal approaches the boiling point of the quenching liquid, the liquid cooling stage is initiated and heat loss (mainly by conduction and convection) is relatively fast.

Precaution—Since all water base quenching media have about the same cooling characteristics in the vapor transport stage, it is particularly important to exercise needed precautions for the control of the vapor blanket stage. Fig. 1 shows duration of the vapor film stage during quenching in several liquids at different temperatures.

The reason cold 10 per cent brine solution takes hold quickly is explained by the short duration of the vapor film stage. Though not shown on the diagram, a quench solution of 5 to 10 per cent sodium hydroxide will minimize soft spots and help uniform hardening. Sometimes glycerine-water mixtures containing from 10 to 40 per cent glycerine are useful.

Soft Spots — Here's another point: The danger of forming soft spots due to steam pockets

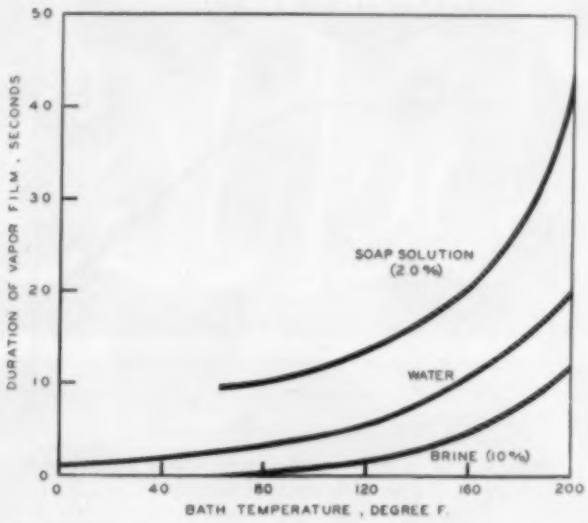


Fig. 1—Duration of the vapor film stage during quenching

is largely overcome when the quench water is circulated rapidly or used as a spray.

Dissolved gases, especially carbon dioxide, are undesirable. They tend to form an insulating blanket when the hot steel is quenched. Other causes of soft spots are decarburization, tong marks and adhering scale.

Thermal Gradient — Structural changes that occur on quenching throw light on dimensional characteristics of water hardening tool steels. Heat is transferred from the surface of a tool to the quenching medium and flows only from the hotter portion to the cooler zones. This means the interior of the work loses temperature at a slower rate than the outside, depending upon the thermal gradient.

Since the thermal gradient in a tool controls the cooling rate at different points within it, a variety of structures (as predicted by the time-temperature-transformation curve) occur. They spread from the surface toward the interior.

Warpage — The time-temperature-transformation curve says that the steel must be cooled rapidly from the hardening temperature to below the temperature of the knee of the curve to minimize formation of transformation products other than martensite. Fast cooling required tends to cause warpage because steels contract on cooling.

Upon continued cooling to room temperature, hardening starts at about 400°F when the austenite transforms to martensite. During this transformation, an expansion takes place. Since the transforming steel is at a low temperature and also is quite rigid, the case tends to upset the hotter portions.

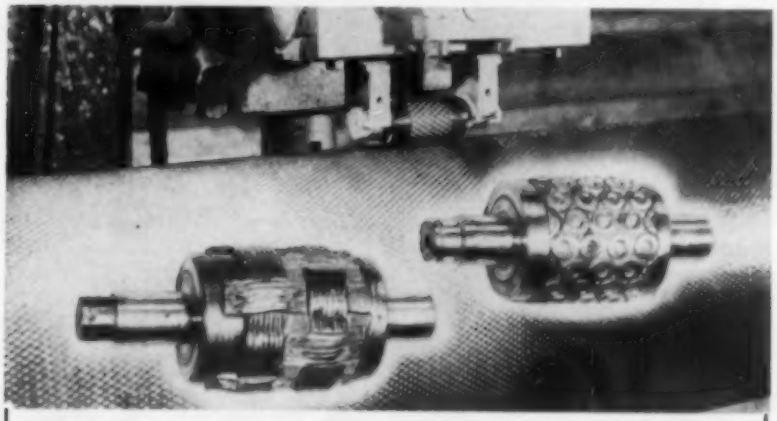
Later on, the remaining austenite cooling at a lower rate, transforms to pearlite of varying degrees of fineness. While this transformation occurs, there is a small expansion at temperatures around 1100°F; subsequently, the transformation product contracts on down to room temperature.

Controlling Factors—It adds up like this: The dimensional change in a tool of the water hardening type depends upon both the mass and the hardenability of the steel.

Small sizes of deep hardenability that harden throughout will expand. Large sizes of shallow hardenability will shrink. Intermediate sizes having a critical hardenability value will not change dimension.

Strained—Tool steels in the as-hardened condition are strained in a nonuniform manner. There is a tendency to warp or crack unless special precautions are taken.

Here's an important point to keep in mind: Cool the tool to a low enough temperature so that sufficient martensite exists (as in-



KEEP REQUIREMENTS IN MIND

These knurling mills produce patterns on large 0.35 carbon steel rolls for embossing cloth, paper and plastic. Mills are hobbed, hand tooled and acid etched before heat treatment. Several requirements must be met: Minimum warpage was one. Some of the patterns were quite fragile; sections as deep as 1/16 in. must not collapse. The heat treated tools must be hard enough to prevent upsetting and tough enough to keep delicate edges from breaking under pressures up to 5 tons. A tough timbre plain carbon water hardening steel does the job.

With the limited heat treating equipment in the plant processing these paper slitting knives, it was found that a plain carbon tool steel with 1.05 per cent carbon, 0.20 manganese, and 0.20 silicon was easy to use for uniform hardness and good toughness

dicated by the time-temperature-transformation diagram) prior to drawing, but not so low as to cause the formation of cracks.

This means a compromise must be made. Good practice is to quench the tool to a temperature so it can be held in the bare hand after removal from quench.

No Delay—Another point: Tempering should be started as soon as possible after hardening. Cracks often turn up in hardened tools that have been at room temperature for a time, even though they were not there right after hardening.

Equipment for drawing is usually a circulating air furnace. Oil baths may be used if the temperature does not go over the fire point of the oil (400 to 600°F, depending upon the oil).

Sufficient Time — Even though the drawing temperature of tools and dies made of water hardening grades are relatively low, it takes a fairly long time for them to reach the temperature of the furnace. A good rule is to allow 20 minutes per inch of the thickest section.

After reaching temperature, work should be held there for one hour per inch of the largest section. For example, a small coining die measuring 2 in. round and 2 in. long should be in the drawing furnace for a total of 2 hours and 20 minutes.

Example—Fig. 2 shows the surface hardness that can be expected when a water hardening tool steel is quenched in brine from 1450°F, then drawn in the range of 200 to 500°F. These hardness values were obtained by drawing for one hour at heat.

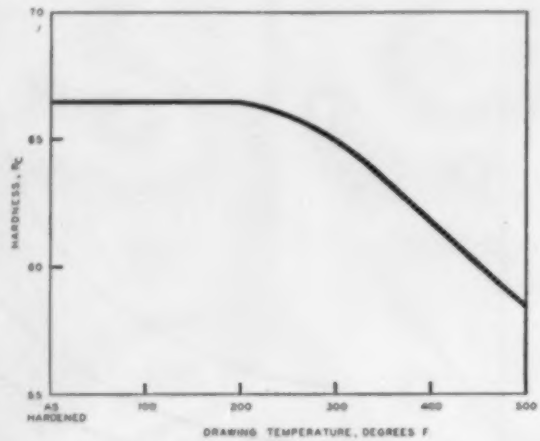


Fig. 2—How drawing temperature affects hardness of a water hardening tool steel

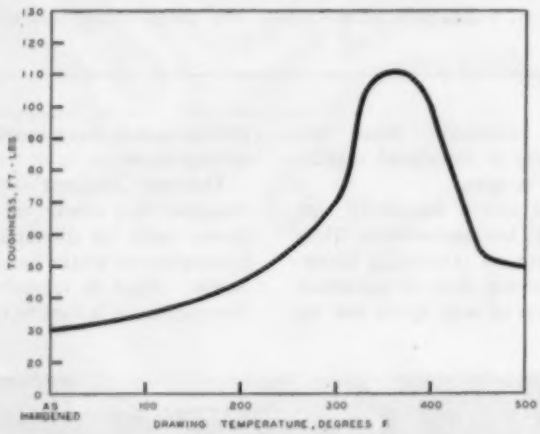


Fig. 3—How drawing temperature affects toughness of a water hardening tool steel

To get the same hardness as for a 1-hour draw, temperature should be lowered by about 25°F for a 4-hour draw; 50°F for an 8-hour draw.

Toughness—Fig. 3 shows the toughness of this material (measured by the torsion impact machine) when drawn at temperatures up to 500°F. Values are typical of tough timbre, water hardening tool steels when drawn for 1 hour at any specific temperature.

Just as with hardness, time affects toughness at the draw temperature. Maximum toughness that is about the same as given by a 1-hour draw can be had by drawing at 350°F for 1 hour; 325°F for 4 hours; 300°F for 8 hours.

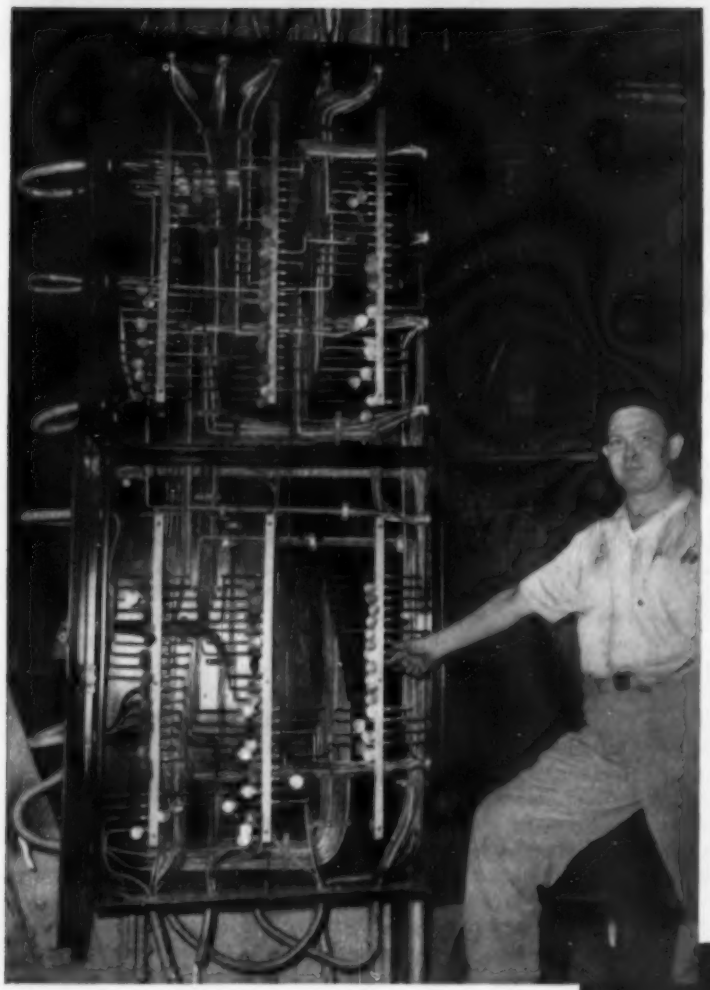
This means the heat treater must decide from the size and shape of the work how long a tool should be drawn and then select the temperature that will give him maximum toughness and hardness.

For the coining die referred to above, the proper drawing temperature is slightly lower than 350°F—about 340°F.

Coming next week: Part 3—Oil and air hardening types

FOR INSTRUMENTATION AND CONTROL

Cabled Tube



Some time ago Revere ran an advertisement featuring Crescent Armored Multitube for use in pneumatic and hydraulic instrumentation and control systems. The advertisement created so much interest that we thought you might like to see a photograph of an actual installation. The Control Board Junction Box shown here has 22 runs of Multitube coming into this box comprising 224 Revere Copper Tubes of 1/4" O.D. The picture was taken in the Glenwood Landing, N.Y. Power Station of the Long Island Lighting Company. The tubes go to instruments that report information on temperature, main and reheat steam pressure, boiler feed and condensate pump pressure, fuel oil and gas pressure, liquid levels, tide level and for the control of fuel feed, draft dampers, boiler drum water level and various control valves.

This is a relatively new use for Revere Copper Tube, but it is an important one in these days when new ways are being found to obtain process information more quickly and accurately, or to achieve automatic control. Crescent Armored Multitube is made by Crescent Insulated Wire & Cable Co., Inc., Trenton 5, N.J., in lengths up to 1,000 feet. It consists of a group of long tubes twisted together in cable form, protected by a flexible interlocked galvanized steel armor, or by plastic, or both. As many as 19 tubes, 1/4" O.D., can be cabled, with one tube in each layer color-coded. Larger tubes can also be cabled, including 5/16", 3/8" and 1/2". This construction affords protection during shipment, installation and use, and speeds up installation greatly. For further information, write Crescent, and for tube in copper and aluminum, see the nearest Revere Sales Office.

REVERE

COPPER AND BRASS INCORPORATED

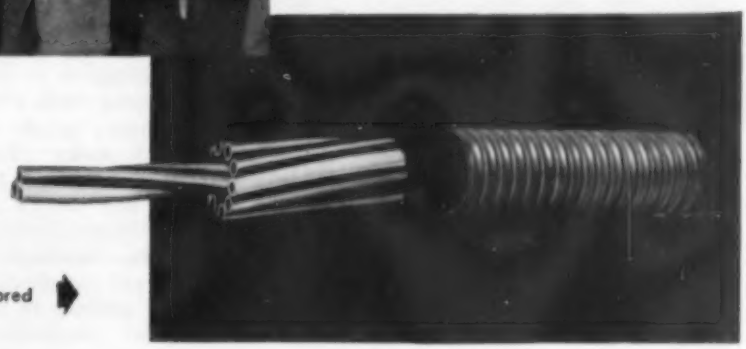
Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

* * *

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

Control Junction Box at Power Station of Long Island Lighting Company, showing use of Crescent Armored Multitube. Note that relatively sharp bends can be made without damage to the cabled copper tube.



Construction of Crescent Armored Multitube.

Typical salt spray test cabinet. This one is in Dr. Max Kronstein's paint research lab, College of Engineering, New York University

Why Use the Salt Spray Test?

This much maligned procedure still has merit. In spite of well-defined limitations, there's still one good reason for sticking with it

By HENRY R. FRIEDBERG
Metal Finishing Consultant
Frank L. Crobaugh Co.
Cleveland, O.

DON'T SELL SALT spray testing short. Like the song says, it will have to do until the real thing comes along.

The real thing, of course, is service environment, but testing in that takes much too long. Salt spray doesn't duplicate service atmosphere; it does give a quick comparison for like subjects.

So long as you respect salt spray's limitations, the test is valuable. For example:

One Good Use—With electrodeposited coatings, salt spray is frequently used as an acceptance test. It gives results that can be duplicated and are comparable.

This is salt spray's main forte—an accelerated comparison or acceptance test for specification purposes. ASTM designation B117-49T describes standard test conditions and equipment, but it's best for the buyer and seller to agree on conditions and how results are to be interpreted.

No Correlation—The test may furnish rapid answers on the breakdown of coatings under a corrosive salt atmosphere. But, except for a few cases, such as coatings to be subjected to a marine atmosphere in service, there is no direct relation between test results and actual in-service performance.

Compare cadmium and zinc coatings. In salt spray, cadmium lasts many hours, depending on thickness of the coating, but zinc has almost no protective value. This isn't true in actual service.

For Likes Only — This test should not be employed to compare different types of coatings. Interpretation of results is too likely to be misleading.

It's not surprising that the paint finishing industry is split on the merits of salt spray. Test conditions aren't standardized for organic coatings, and there's no agreement on evaluation or meaning of results. The wide range of organic finishes and application methods makes it difficult to use the test for paint comparisons.

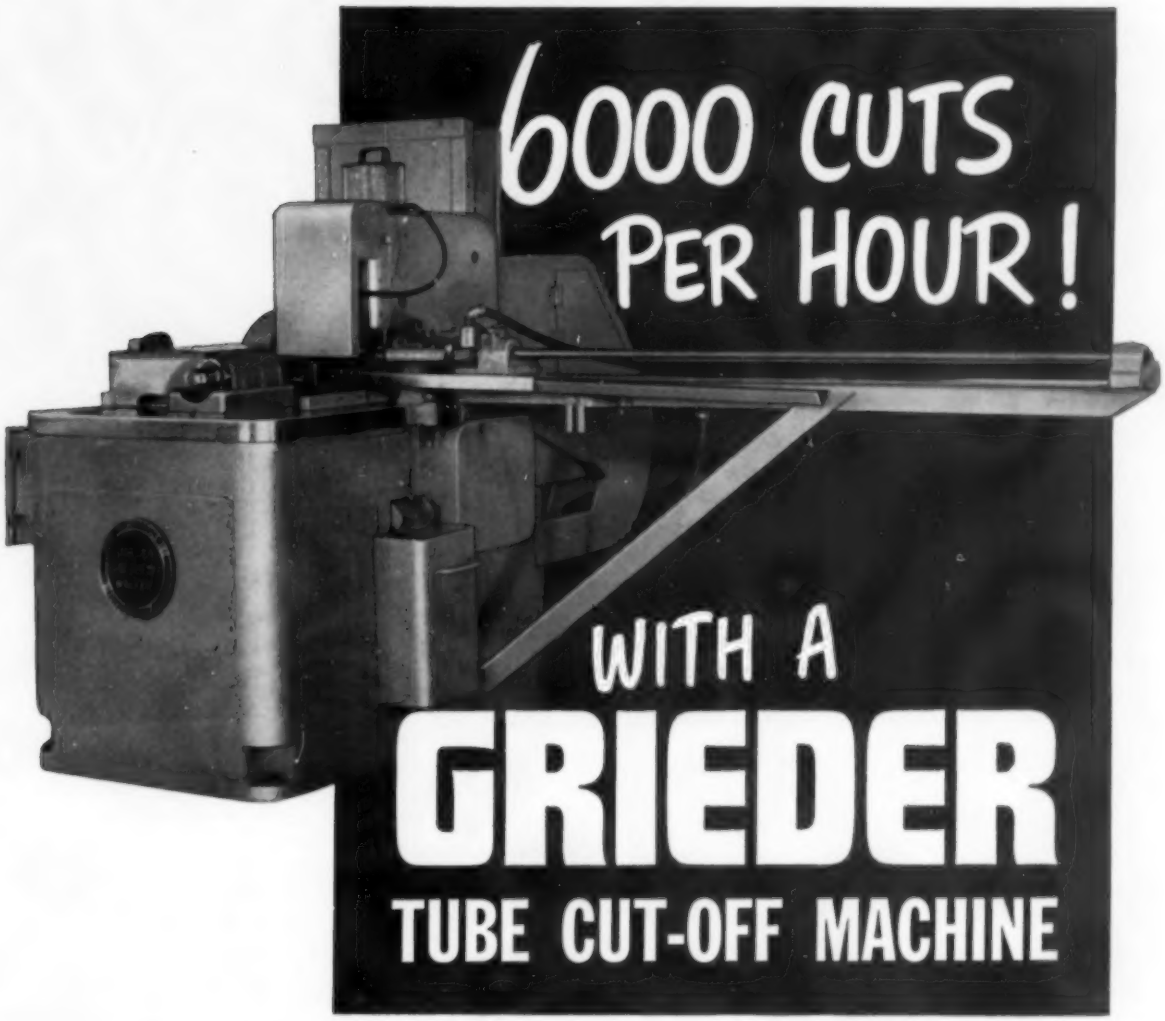
Little Things Matter—Little differences greatly influence results—position of test panels and how they are supported, for example.

ASTM procedures specify that test panels be supported about 15 degrees from the vertical and parallel with the main direction of the horizontal flow of fog. This keeps droplets from collecting or running down a path on the panel.

If production parts are tested, cut edges or other unprotected areas must be masked with wax to prevent creeping corrosion.

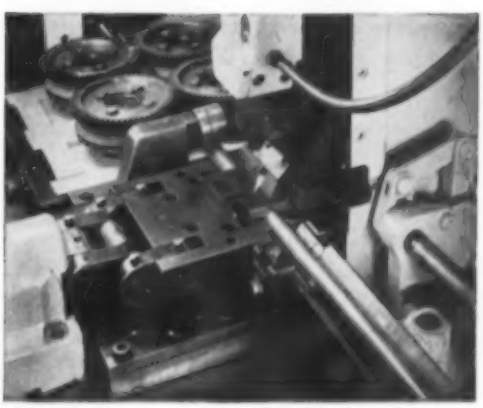
More Variables—If scratch or scribe marks are used on the panel to evaluate corrosion, it is necessary to agree on a uniform method to produce the scratch. Fluctuation in air pressure of as little as ± 0.5 psi when operating the nozzle at an average of 16 psi will increase corrosiveness of the fog about two fold.

Preparation of the base metal before applying the coating may also be of tremendous influence in the performance of test panels.

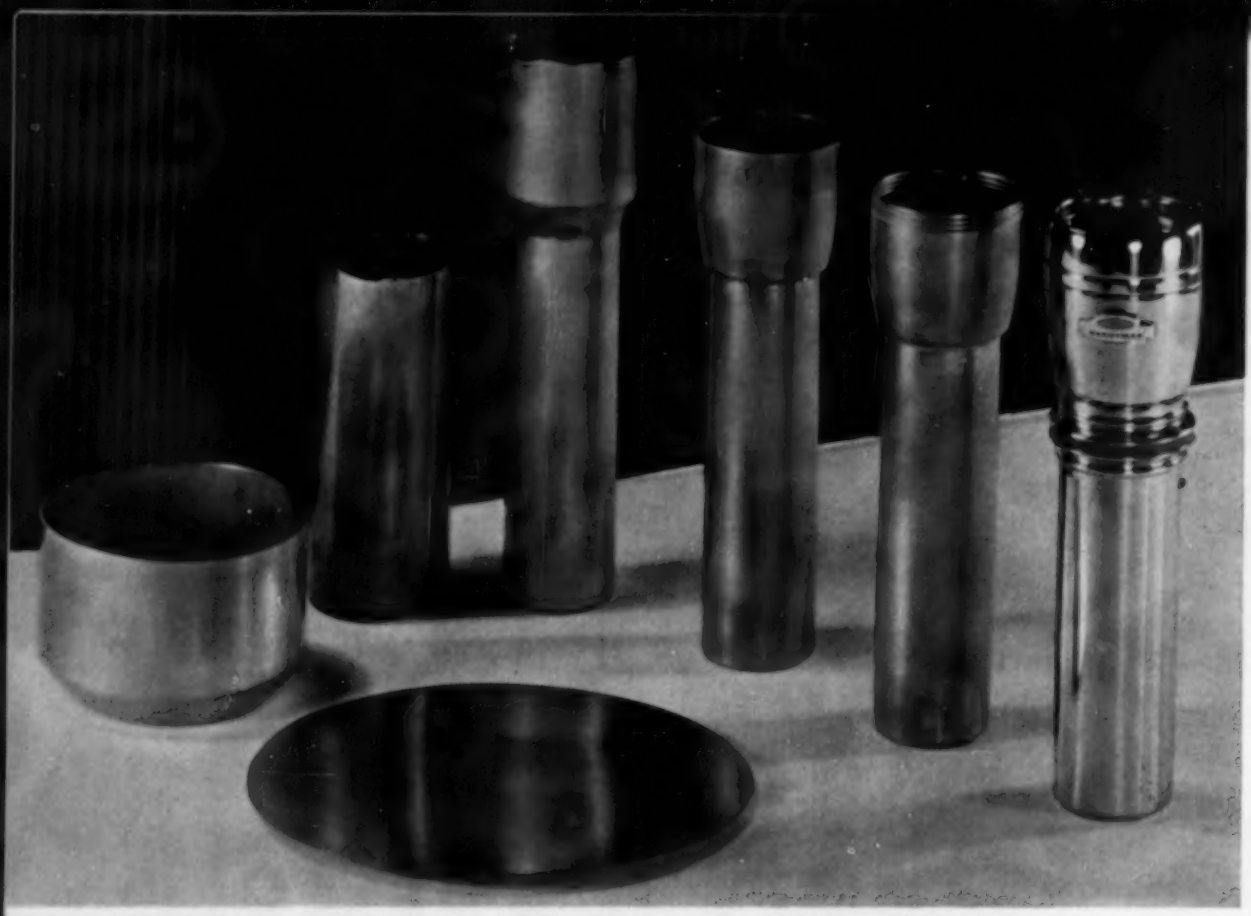


NO DISTORTION... MINIMUM BURR...
ACCURACY WITHIN .002"...
CUTS ANY SHAPE...

Cut steel tubing at the amazing speed of 6000 cuts per hour. The Grieder Tube Cut-Off Machine features a heavy duty air operated combination clutch and brake unit that allows continuous operation at this terrific rate of production. Fully automatic... Rate of feed: 600 feet per minute ... True cutting. Get full information, multiply your tubing production, reduce costs, write *today*.



GRIEDER INDUSTRIES, INC.
BOWLING GREEN, OHIO



1. The Evolution of a flashlight, from electro-copper coated steel strip to finished product . . .

$100,000-A-Year Production Idea

Take a stroll through the Blake Manufacturing Division of Ray-O-Vac Company. Then you will understand how this firm arrived at its slogan: "Miracles in Metal."

In its plant at Clinton, Massachusetts, Ray-O-Vac produces the largest line of flashlights in the world, all of modern styles and designs, ranging from pocket models to five-cell spotlights and Hunter Lanterns. The volume moving off the production lines, wrapped and packaged for display, runs into the millions each year.

From start to finish, the plant is modernly equipped and efficiently organized. Through experience and ingenuity, it has developed production techniques that are in many ways unique. For example, take the manufacture of flashlight cases.

On models where brass traditionally has been most used, Ray-O-Vac is now making cases of steel. Because both types of cases are chrome finished, you can't tell a brass flashlight from a steel one by looking at it. They are both corrosion resistant, highly polished, and beautifully contoured.

But try standing on one. The brass case flattens out. The steel case doesn't. Ray-O-Vac has come up with a rugged product that gives it a quality advantage in competitive markets. The interesting fact is that it has done this with production savings that run from 17 to 29 per cent.

• **How It Was Done**—As in most worthwhile ventures, the transition wasn't made overnight. Blake Division engineers first began experimenting with plain drawing quality steel. The depth of the draw required for a flashlight case is an extremely severe one. No matter how they designed their dies or regulated the drawing cycle, they couldn't find a plain steel that would do the job.

Next, they called in the specialty strip men from Thomas Strip Division of Pittsburgh Steel Company. Thomas development engineers joined Blake's, and together they began exploring the possibilities of special drawing quality steel with an electrolytic coating of copper. The copper coating provides a good die lubricant and a good base for chrome plating.

One year and nine trial lot shipments later, they came up with the answer. Today, Blake is using .020 gage non-scalloping deep drawing quality strip steel produced by special processing techniques developed at Thomas, electro-copper coated on both sides, 6⅝ inches wide in 450-pound coils.

This may sound complicated, but specialty strip steel such as this is the forte at Thomas, and they can produce it with consistently uniform quality that gives Blake a maximum yield from every coil.

• **In Production**—To watch these coils of electro-copper coated strip become flashlight cases at Blake gives you the impression that if there is nothing miraculous involved, at least the engineers were closely akin to technical wizards.

The coils are fed into a double action press. It cuts a round blank from the strip that is 6.398 inches in diameter. From there, in a series of four drawing operations without annealing, this round, flat disc of cold steel becomes a single-piece flashlight case 7½ inches long with a battery case diameter of 1.517 inches

2. Begins at this double action press that blanks out a circular disc and draws it into the shape of a cup.

3. The Cup Becomes a Tube as the cold steel flows under tremendous pressure, then shaped into a...

4. Flashlight Case on a horizontal press that also forms the flashlight head.

and a formed head with a diameter of 1.945 inches (photo No. 1).

As the first press has a double action (photo No. 2), it also makes the first draw. Here's where the "Miracles in Metal" begins as the steel flows under tremendous pressure, producing a smooth-surfaced and even-edged cup 3⅛ inches deep with a base diameter of 3.480 inches. The redraw press (photo No. 3) makes two draws with the maximum reduction on each. It turns out a closed end tube 5 inches long and 1.954 inches in diameter.

The tube is then fed to a horizontal redraw press (photo No. 4) that makes a further reduction, forming the cell case and head. The head is trimmed, shaped, roll threaded and knurled. Finally, the case is given a heavier copper plating, buffed and polished, chrome plated, then delivered to the assembly lines (photo No. 5).

Compared to the fabrication of cases with brass, electro-copper coated strip is fabricated more rapidly and requires less processing. Two annealing and pickling operations and one redraw have been eliminated. Fewer tubes need to be stocked ahead of press operations. From the first press through the last forming operation, Blake's equipment produces steadily at a rate of about 1,400 pieces an hour.

• **The Pay-Off**—Savings, including the lower initial cost of electro-copper coated steel strip compared to brass, range from 3 cents to 6 cents per flashlight case on models produced from steel. On three popular models alone, these savings amounted to more than $100,000 last year.

Add to this the important fact that Ray-O-Vac is building a better quality flashlight with advantages that increase sales, and the slogan "Miracles in Metal" takes on increased significance.

If you are fabricating products from more expensive metals, why not consider the use of Thomas precoated strip steel? Perhaps you can accomplish similar savings and improve your product.

Thomas strip begins with good steel of correct analysis in a variety of tempers. It is cold rolled to exacting tolerances. Then it can be coated electrolytically with zinc, lead alloy, copper, brass, nickel or chrome . . . hot dip tin and lead alloy coated . . . or lacquer coated in different colors. It offers the luster of planished or buffed finishes. Altogether, Thomas produces the widest range of strip steel specialties in the industry.

Thomas Strip is more than a product, it is a production idea. Why not call a representative to discuss your problems with you and offer suggestions. You will find him ready to give you prompt, personal service without obligation. *Write for descriptive literature.*

5. Finished cases receive a chrome plating. Assembly of switches, lens rings, springs, caps, etc. is done on one of eight lines such as this, producing at rates up to 30,000 packaged flashlights a day.

"Everything New But The Name"

Thomas Strip P

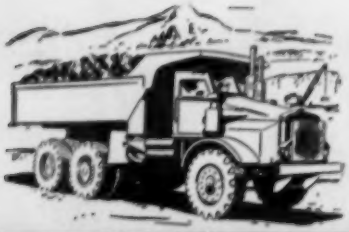
Division

Pittsburgh Steel Company

Grant Building • **Pittsburgh 30, Pa.**

DISTRICT SALES OFFICES: Atlanta • Chicago • Cleveland • Columbus • Dallas Dayton • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh San Francisco • Tulsa • Warren, Ohio. **PLANTS:** Monessen, Pa. • Allenport, Pa. • Akron Los Angeles • Unionville, Conn. • Warren, Ohio • Worcester, Mass.

PRINCIPAL PRODUCTS: Hot and Cold Rolled Strip and Sheets • Strip Specialties • Seamless Tubular Products • Wire and Wire Products • Chain-Link Fence • Cargotainers • Steeltex



Better Cuts Make Better Fits for Road Machinery Builder

This rugged machine is in service two shifts — 16 hours a day — five days a week shearing parts of various thicknesses and shapes for heavy earth-moving equipment. It is rated for mild steel 12' x 1".

THE ease with which good, square, accurate cuts are obtained has made the Steelweld Shear of a road machinery manufacturer very popular with the operators and shop management.

Experienced with various type shears, they know the importance of easy knife clearance adjustment. They know that the best cuts are obtained when the correct clearance is provided for each thickness of plate being cut. As they point out, improper knife clearance on any shear often results in a heavy plate being cut at an angle with respect to the thickness, or light gauge metal burring.

Adjusting knife clearance on Steelweld Shears is such an easy, quickly-performed task that operators take care of it automatically. Turning a hand crank until a gauge pointer is on the proper metal-thickness figure is all that is necessary — a task done in a matter of seconds.

The big time saving made on knife changing as compared with most shears is another factor greatly appreciated. Easily done in two hours on a Steelweld, this job frequently requires all day on other machines.

Steelweld's unusual pivoted-blade operating principle makes possible outstanding cost-cutting advantages. For the complete story, send for the catalog below.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7840 East 282nd Street, Wickliffe, Ohio

STEELWELD PIVOTED BLADE SHEARS

Over-all view of the potline at Reynold's reduction plant at Arkadelphia, Ark. Row of pots is electrically connected in series in one power circuit

Giant Aluminum Pots in Production

TWO reduction plants recently started by Reynolds Metals Co. are helping to meet the increased demands for primary aluminum. They are said to contain the largest reduction cells ever operated in a commercial line producing aluminum.

One plant is near Corpus Christi, Tex., and the other is at Arkadelphia, Ark. They have rated annual capacities of 160-million and 110-million lb respectively.

Daily Output—Experimental development on these giant cells was nearing completion at the outbreak of the Korean War. They are from two to six times the size of other units in use in this country. Each unit has a daily production of about 2000 lb of high grade aluminum, and each is fed at a daily rate of 4000 lb of alumina (aluminum oxide) and about 1000 lb of carbon anode material.

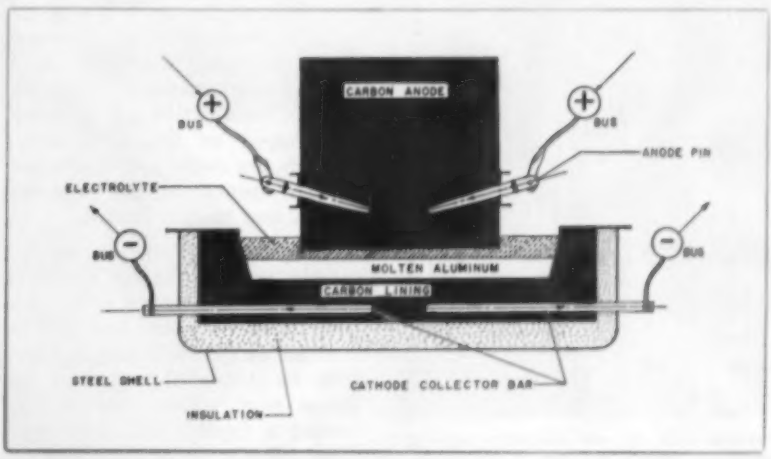
This reduction cell is of the Soederberg type, as shown in the diagram. It requires over 90,000 lb of steel in the fabrication of the shell and superstructure frame. The lower half of the cell makes up the cathode, and consists of a fabricated box about 12 ft wide, 38 ft long and 3 ft deep. Over 60,000 lb of carbon lining is rammed into it, leaving a formed cavity 16 in. deep and somewhat smaller than the dimensions of the shell.

This cavity holds the molten aluminum as it is produced, as well as the electrolyte material used in the process.

Series-connected—The cells are arranged for a series electrical circuit, with the current flowing through the bus to the anode of the first cell, through the electrolyte and metal pad and on into the cathode. From the cathode it flows through the bus to the anode of the second cell and so on down the line.

Normally, the line consists of 160 cells, with 80 cells in each of two parallel buildings. In the first, the power moves away from its source; in the second, it is returned to its source. Each building is made of steel frame with aluminum roofing and siding, is more than 1800 ft long and covers over 2½-acres.

The power source of such a line must have a direct current capacity of about 100,000 kw, which is enough to supply a city of 300,000 population.



Alumina serves both as electrolyte cover and ore source in reduction cells

Only air that has passed through electronic recipitators is allowed to enter this 40-in. blooming mill motor room

Dust Barred from Motor Room

Outside air stripped of entrained dust particles by electronic precipitators and circulated through motor room dissipates the generated heat

By P. J. ZILLES
Precipitron Product Manager
Westinghouse Electric Corp.
Hyde Park, Mass.

TAILORED atmospheric conditions are maintained in the motor rooms located in the heart of the latest steel mill—the Fairless Works, U. S. Steel, Fairless Hills, Pa. Amid piles of ore, glowing furnaces and hot steel, these shelters for the all-important electrical equipment stand out like an oasis in the desert.

Intake side of air cleaners serving 5-stand cold mill. This bank cleans 420,000 cfm of air

Despite conditions outside, the air inside these rooms is clean—electronically cleaned to have less dirt than might be found in the air at a mountain resort. Yet this air is changing constantly in a cycle of short duration. Each cubic foot comes from out of doors, is stripped of its dirt, blown through the room and discharged through openings in the huge motors in less than a minute.

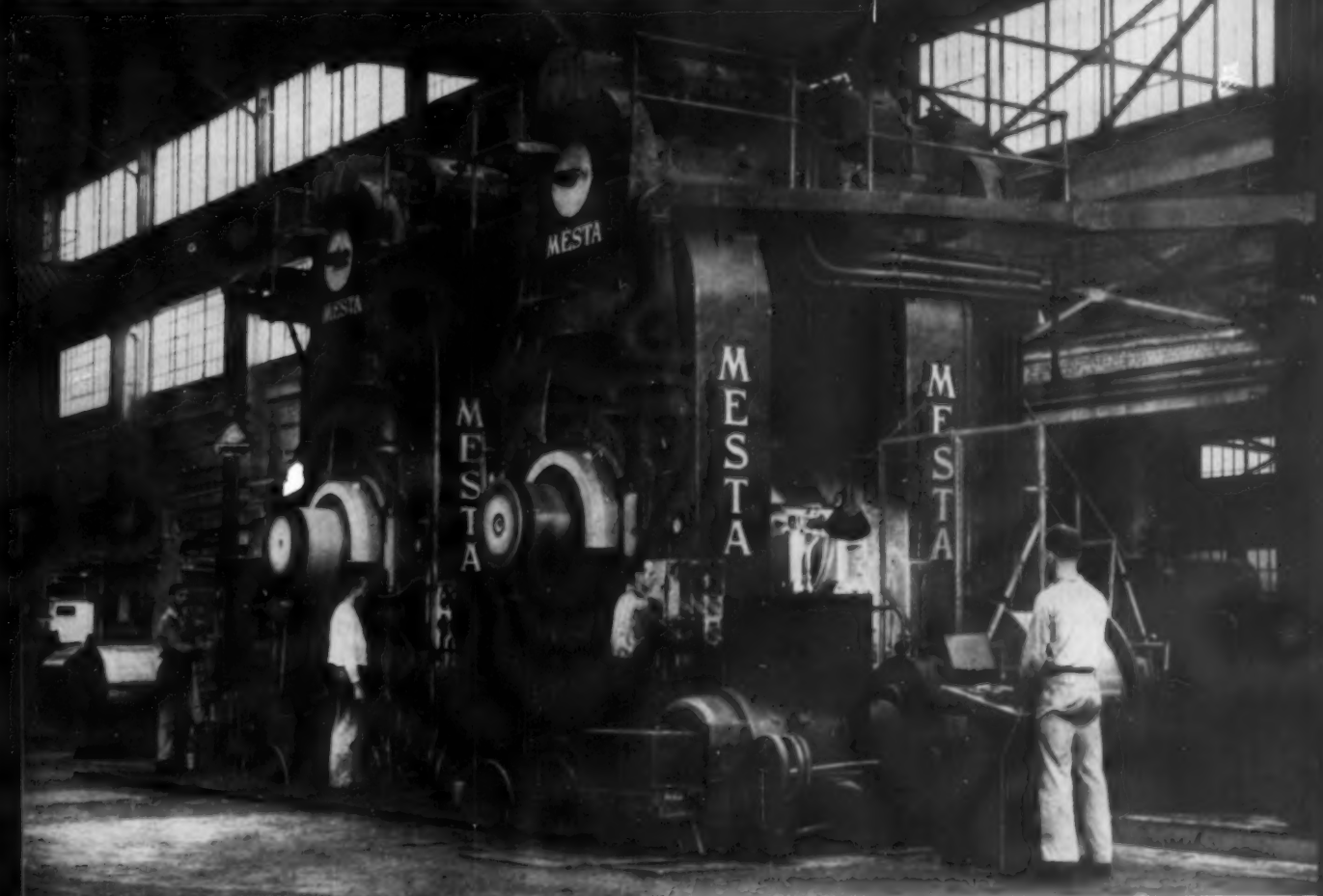
Adequate ventilation is an important requirement for electrical equipment of this type. For each kilowatt of electrical loss, 125 cu ft of air at available temperatures must be circulated to absorb the excess heat. Thus, the motors driving a typical mill may need from 100,000 to 400,000 cfm of ventilating air. For Fairless Works, more than 3½ million cfm of air must be handled for electrical equipment ventilation purposes.

Cleanliness Is Paramount—The clean appearance of the typical motor room is significant of something far more important than good housekeeping. Air nearly always carries appreciable quantities of dirt as finely divided particles. Light fluffy ashes settle in and around motor windings to interfere with the proper dissipation of heat; conductive dirts collect on insulating surfaces and increase the electrical leakage to a dangerous point. Abrasive elements accelerate wear and shorten the life of commutators, slip rings and contact points, and just plain dirt clogs ventilating passages and chokes off the proper flow of air.

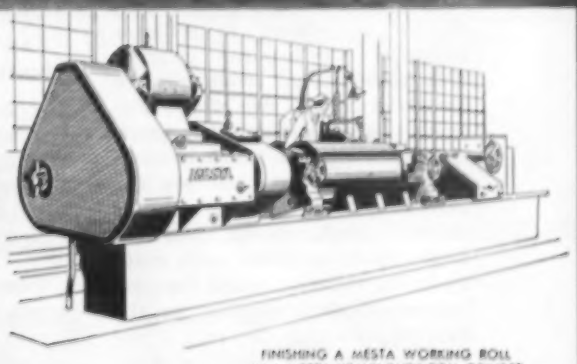
Unless air is properly cleaned, some of the foreign material is continually strewn along the path

MESTA

HIGH-SPEED COLD MILLS



MESTA 42" FOUR-HIGH, TWIN-STAND HIGH-SPEED SKIN PASS MILL INSTALLED IN A LARGE EASTERN STEEL PLANT

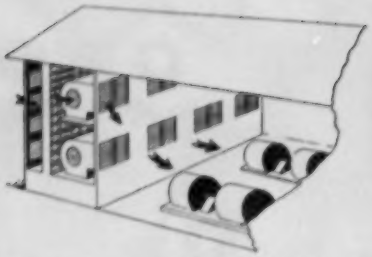


FINISHING A MESTA WORKING ROLL IN A MESTA HEAVY DUTY ROLL GRINDER

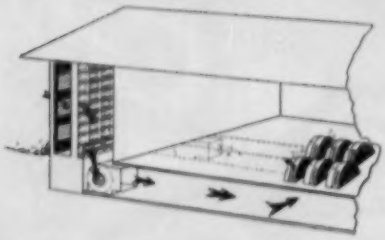
Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

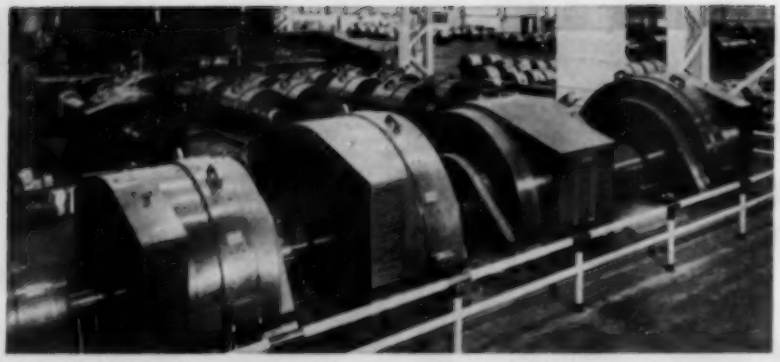
PITTSBURGH, PENNSYLVANIA



Sketch showing flow of outside air into typical motor room



Sketch showing air flow through tunnels to main mill area



Motors and generators serving this mill are cooled by clean up-draft ventilation air from tunnel ducts

as the air is moved and distributed. Even small amounts of dirt undetectable in the air except by special measurements soon multiply to imposing totals when quantities of the air are handled. And with this multiplication comes increasing maintenance, costly production losses and ever-increasing risks for expensive machinery.

To guard against costly maintenance shutdowns and protect valuable electrical equipment, the Fairless Works was equipped throughout with Westinghouse Precipitron electronic air cleaning units designed to remove 90 per cent or more of the particulate matter from an air stream, regardless of particle size or makeup.

How Precipitator Functions—These air cleaners use electrical forces to clean air. They charge particles of floating dirt, and then attract these charged particles out of the air stream to collector plates of the opposite polarity. This method of air cleaning is not hampered by the size of the particles. Large particles take greater surface charges which increase the attractive force between the particle and the charged collector plates. Smaller (even submicroscopic sized) particles move readily to the collector, when charged, because of their mobility in air. Particle collection efficiency is extremely high for particles from 100 microns (1/250-in.) down through fumes and smokes to the point where individual particles can no longer be detected (less than 0.1-micron or 1/250,000-in.). Because of this, electronic cleaning gets six to eight times more dirt volume from an air stream than is usually removed by filtering, and this is accomplished without impeding air flow.

Dirt accumulations are removed from the electronic precipitator units by water washing every three to four weeks. All units are equipped to do this automatically, requiring little more than supervisory attention on the part of the system operators. The units can be washed down without shutting down the fans or materially reducing the cleaning efficiency during the servicing period.

There are 20 principal Precipitron cleaner systems serving various mills on the property, plus numerous smaller ones for office air conditioning and miscellaneous uses. All units throughout the works are of the same type and some idea of their sizes can be gleaned from these applications:

Application	Capacity, cfm	No. units	Size, ft*
5-st. cold	420,000	1	14 x 90
4-st. cold	420,000	1	14 x 90
Tinning line	210,000	1	14 x 45
80" strip	462,000	3	12 x 27
40" blooming	336,000	1	14 x 36

*Height and length

Some of the mills have motor rooms where the drive motors are ventilated with a down draft of air taken from the room. The motor room is kept under slight positive pressure and is supplied with sufficient electronically cleaned air to meet the ventilation and leakage requirements. In many instances, however, the mill drive motors are located within the mill area and are ventilated with up-draft ventilation drawing cleaned air from tunnels beneath the floor. Supply air to the tunnels passes through a Precipitron unit before reaching the supply fans. Provisions are made for some air recirculation during extreme cold weather, but normally all ventilating systems operate with 100 per cent outside air.

System Has Many Features—Almost every system displays features worthy of copying. Air intakes, for example, are generously sized for low inlet air velocity, and are correctly located with respect to prevailing winds. This prevents this part of the system from becoming a gigantic vacuum cleaner sweeping in all of the dirt from the surroundings, and reduces the load on the air cleaner.

Plenty of room is provided for the air cleaners. Not only does this facilitate inspection and servicing but it allows sufficient space for the flow of air to equalize before it passes through the cleaner. This minimizes spot overloading and enables the cleaner to give equal treatment to all air processed.

Ready sources of hot water at each unit location simplify and facilitate the periodic routine cleaning. The units "come clean" with each wash so that quarterly or semiannual shutdowns are unnecessary.

THESE "iron marbles" are opening a vast new source of high grade raw material for the iron and steel industry.

Steel men have worried for years about the dwindling supply of easily-accessible 52% iron ore in the Mesabi range and the rapid depletion caused by war-time and postwar production. But something important has been done about it.

McKee engineers collaborated on a method for producing heat-hardened pellets from low-grade taconite, the iron-bearing rock of which the Mesabi range is largely composed. The new product, containing 60 to 65% iron, is superior in almost every way to the highest-grade ore ever mined in the area.

This is a typical example of forward-looking McKee engineering.

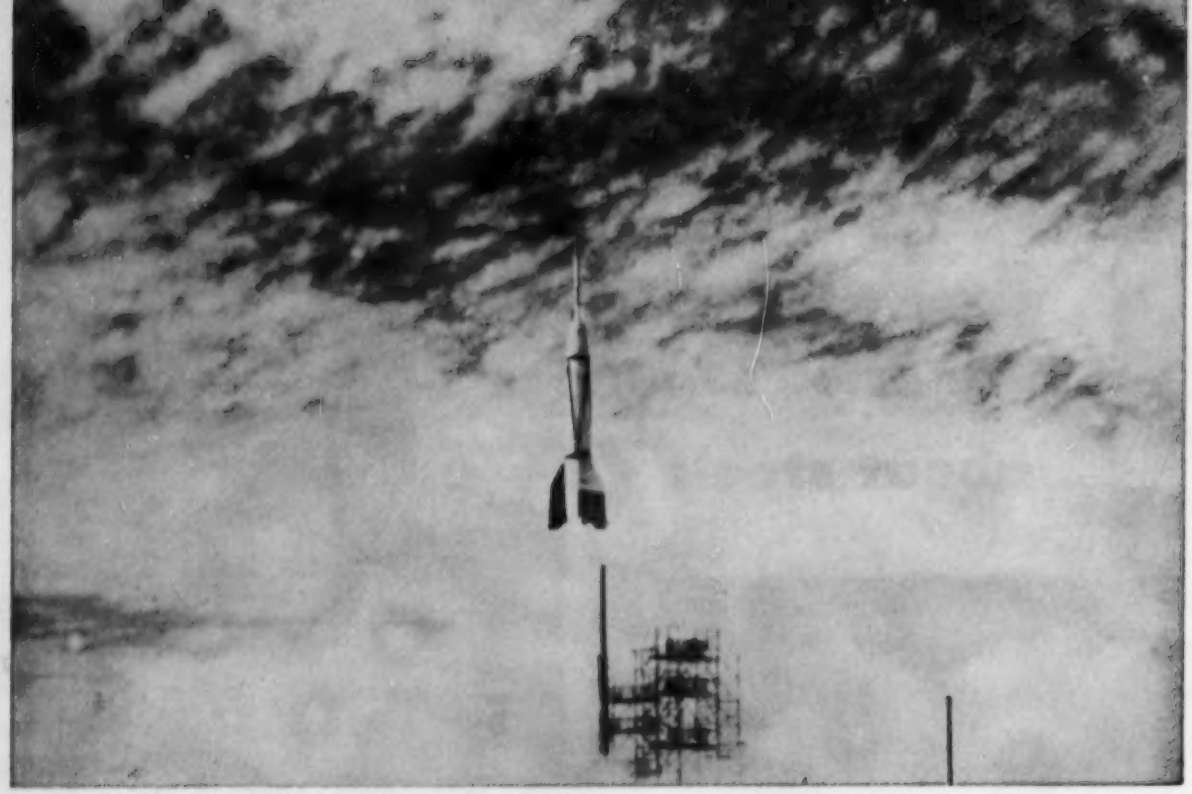
50th ANNIVERSARY

McKee Engineering Services

Arthur G. McKee & Company • Engineers and Contractors

Headquarters: McKee Building • 2300 Chester Avenue • Cleveland 1, Ohio
Offices: New York • Tulsa, Oklahoma • Union, N. J. • Washington, D. C.
British Representatives of Metals Division: Head, Wrightson & Co., Limited
Canada: Arthur G. McKee & Company of Canada, Ltd., 372 Bay St., Toronto

The flameholder of a ram-jet engine illustrates what metal must



Where Heat Is King

There's plenty of room for improvement in high-temperature materials. Here's where we stand today

By ALAN LEVY
Supervisor, Material & Process Section
Marquardt Aircraft Co.
Van Nuys, Calif.

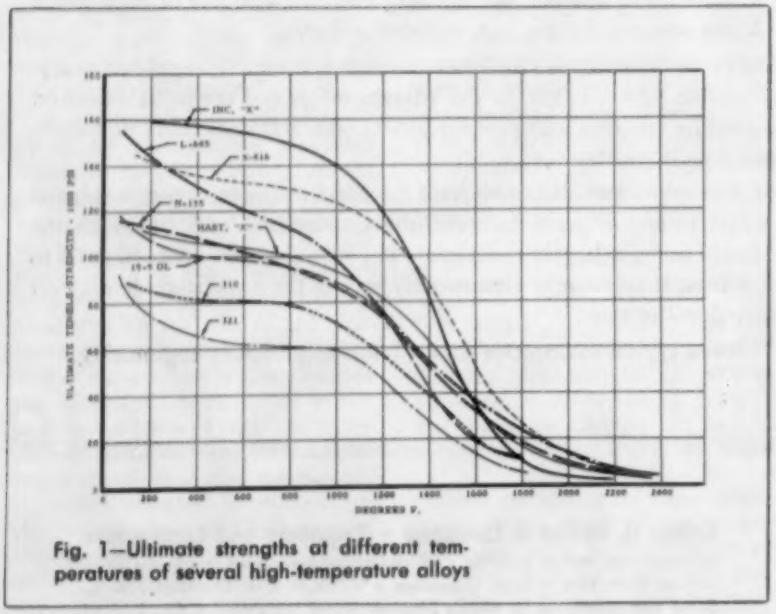


Fig. 1—Ultimate strengths at different temperatures of several high-temperature alloys

POWER-PLANT engineers, facing the thermal barrier with inadequate alloys, are up against some of metallurgy's toughest problems.

Many modern fuels burn at temperatures above the melting point of the highest-melting-point metals. Most of the refractory metals, with melting temperatures over 3000° F, are brittle and susceptible to rapid oxidation. The melting point of the basic structural metal element, iron, is only 2800° F.

Too Hot—As alloying elements are added, melting temperature becomes lower. Cobalt and nickel melt below 2800° F, their alloys in the 2400 to 2600°F range. All present structural materials capable of unprotected operation above 1500° F melt below 2700° F, and to the combustion engineer, 2700° F is a low gas temperature.

Table 1—COMMON HIGH TEMPERATURE ALLOYS

A. Iron Base Alloys

Type 321, 347 stainless steel—Stabilized 18 per cent Cr, 8 per cent Ni basic nonhardenable stainless steel. Excellent fabrication characteristics, weldable and fully corrosion resistant. Commonly used in elevated-temperature applications to 1500° F where medium strength and corrosion resistance are required.

Type 310 stainless steel—A standard AISI steel containing 25 per cent Cr and 20 per cent Ni. Excellent scaling resistance up to 2000° F and over. Used where high strength is not needed at temperatures to 2200° F.

19-9 DL, 19-9 DX—A low alloyed (with Mo and W) modified stainless steel. Retains strength comparative to most high-temperature alloys to 1400-1500° F. Excellent low critical alloy for general structural use to 1500° F.

16-25-6—A Cr, Ni, Mo alloy available in bars and forgings. Commonly used turbine wheel material for service to about 1500° F.

A-286—An age hardenable stainless steel material that can be used up to the low end of the temperature range, around 1200° F.

17-4 PH, 17-7 PH—Age hardenable stainless steel materials that have high strength-weight ratios at lower temperatures, but find some application in the temperature range around 1000° F.

Discaloy 24—An age hardenable stainless steel primarily used as forged wheel alloy to 1300° F.

B. Nickel Base Alloys

Inconel—An 80 per cent Ni, Cr, Fe alloy much used as a low-strength, high-corrosion-resistant material at elevated temperatures. Hot-short (low ductility) at 1200° F, not commonly used in power-plants today.

Inconel X—Age hardenable offspring of Inconel containing Ti and Al for age hardening. Tops in strength up to 1600° F of all high temperature alloys. Difficult to fabricate, must be heat treated after forming. Widespread use as a combustion chamber material for afterburners.

Incoloy—Lower critical alloy version of Inconel X with somewhat lower properties.

Nimonic 75, 80, 90—Series of British-developed alloys similar to Inconel X in composition and function.

Hastelloy B—Haynes Stellite development that contains Mo as the major alloying element and no Cr. Absence of Cr and high percentage of Mo lowers its scaling temperature. Excellent strength to 1600° F and higher.

Hastelloy C—Haynes Stellite product that contains Cr for increased scaling resistance. Has been used for high-strength applications to 1800° F and above. High critical alloy content and fabrication characteristics limit its use.

Hastelloy X—Lower critical-alloy version of other Hastelloys that combines excellent scaling resistance with good strength. Being used more and more in combustion chamber and component applications.

C. Cobalt and Mixed Base Alloys

N-155 (Multimet)—A Cr, Ni, Co, Fe mixed base alloy. Has become somewhat of a work horse in the temperature range from 1200° F up. Considered a scrap-base alloy. Good high-temperature properties to 2000° F, compared to other alloys. Can be readily fabricated; requires no heat treatment.

S-816—Mixed base alloy with 3 per cent or higher Cb, W and Mo. High on the critical alloy list. Excellent strength at the higher temperatures. Used extensively for forged turbine blades.

Refractalloy 70—Mixed-base alloy with high Mo. Good elevated-temperature properties. Not widely used.

L-605 (H.S.25)—Co base material that is strongest of high-temperature alloys above about 1600° F. Used only where high stresses exist at upper end of the temperature range (1700-2200° F). High critical alloy content.

H.S. 21, 23, 30, 31, etc.—Series of Co base casting alloys. Commonly used for cast turbine blades and other high-temperature applications requiring high strength.

The flameholder of a ram-jet engine illustrates what metal must face. It is exposed to thermal punishment of 3500° F on one face, cooling air at 700° F on the other. Hot spots may hit 2000° F and more. Not many metals will take this for long.

Old Stand-bys—The alloys that retain sufficient strength to be used above 1200° F have iron, nickel or cobalt as the major constituent. In general, alloys of iron are used in the temperature range up to 1500° F, alloys of nickel 1500° F to 1800° F and cobalt alloys 1600° F to 2200° F (Table 1).

New alloys are being developed. They are based on molybdenum, titanium and possibly chromium and other metals, but at this time iron, nickel and cobalt are the foundation elements for the high-temperature alloy field. (Table 2.)

Poor Pickings — There's no simple rule for selecting a metal for elevated temperature use. Its strength depends on the type and duration of loading.

Short-time tension, compression, shear and bearing strengths are of primary importance in the design of short-service-life power plants such as guided missile and rocket engines. Creep and stress rupture become more important as service life increases. Fatigue strength, notch-impact and notch tensile strength, modulus of elasticity, thermal shock and fatigue must be considered in most designs for ram-jets and turbo-jets.

Heat and Strength—Metals lose their strength with increasing temperature in different ways. Age-hardenable materials overage. Work-hardened materials anneal themselves at operating temperature.

Materials containing many different alloying elements form new phases at elevated temperature and can lose strength or become brittle. The atomic bonding that holds metals together changes when subjected to the additional heat energy.

Strength and Time — Because metals lose strength by several mechanisms, service temperature and service life must be carefully considered. Some metals have comparatively high short-time strength but considerably lower

Table 2—FUNCTIONS OF ALLOYING ELEMENTS

Iron—Foundation element for structural metals.

Nickel—Austenitizer. Improves oxidation resistance in stainless steels; adds high-temperature strength; improves corrosion resistance.

Cobalt—Base metal for highest strength high temperature materials. Improves high temperature strength in mixed alloy materials (N-155)

Chromium—Primary source of oxidation resistance.

Molybdenum—Improves high-temperature strength. Adds corrosion resistance; has precipitation hardening potential in some alloys.

Tungsten—Improves high-temperature strength.

Columbium—Stabilizing element in austenitic stainless steels. Adds high-temperature strength.

Titanium—Same as Cb, but has precipitation hardening value in some alloys.

Aluminum—Primarily added as precipitation hardening agent. (17-7PH, Inconel X)

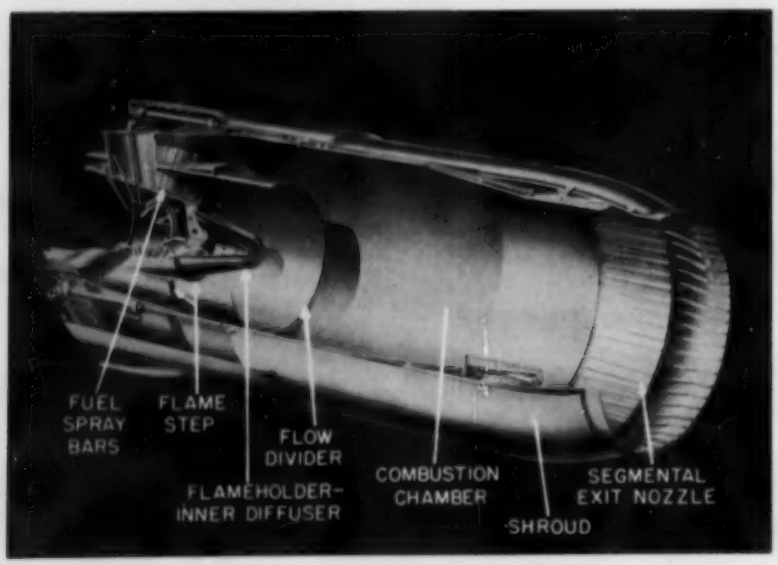
Vanadium—Thought to improve creep resistance.

Silicon—Added up to about 2 per cent to improve oxidation resistance in some stainless steels.

Critical Alloying Elements

Molybdenum	Nickel
Chromium	Cobalt
Tungsten	Columbium

Fig. 2—A typical afterburner



creep strength than others. Some have hot short or brittle ranges. Others precipitate constituents in grain boundaries, severely reducing their performance under load.

The rate of change of strength with temperature also varies with the alloys. Inconel X in its heat-treated condition is the strongest material up to about 1600° F due to a hot-short phenomenon. L-605, a high critical alloy content material retains the greatest strength at temperatures in excess of 1600° F. (Fig. 1.)

Too Few Facts — Though the strength level at 1800° F and up for all alloys is low, components of afterburners and ram-jet engines can be designed to function at temperatures up to 2200° F for short times. It is essential, however, that the strength be known at these temperatures, so that compensating increased thicknesses can be used.

Unfortunately, data at high-temperature levels are limited. Haynes Stellite Co. recently obtained data on short-time tensile properties up to 2400° F or just about to the melting temperature of the alloys tested, but much more work in the shorter time range must be done in obtaining creep and stress-rupture data. (Table 3.)

Physicals—In addition to mechanical properties, physical properties of metals, such as coefficient of thermal expansion, thermal conductivity and emissivity, become important in elevated-temperature service. Thermal stresses due to differential expansion can compose more than 50 per cent of the total load on the part. Many cases of failure due to differential thermal expansion are on record.

For example, the flameholders of afterburners are subjected to temperatures of 1800 to 1900° F at and near the flame step. Problems of differential heating inducing thermal stresses, radiation from one surface to another building up temperature and high collapsing pressures for the service temperatures all tend to cause premature failure, unless some cooling method is incorporated in the design.

Flameholders—A typical afterburner flameholder consists of two truncated sheet-metal cones with a flame step between them. (Fig.

Table 2—EXPERIMENTAL ELEVATED TEMPERATURE PROPERTIES

Temp °F	HASTELLOY X Ultimate Strength (psi)	HASTELLOY X Elong* %	MULTIMET (N-155) Ultimate Strength (psi)	MULTIMET (N-155) Elong* %	NO. 25 ALLOY (L-605) Ultimate Strength (psi)	NO. 25 ALLOY (L-605) Elong* %
1800	15,320	42	19,200	61	22,300	43
1800	15,220	50	19,500	55	23,900	44
2000	9,280	41	9,425	45	12,800	31
2000	9,340	37	9,370	46	12,900	28
2200	4,680	43	4,600	29	6,770	17
2200	4,575	37	4,630	26	6,800	10
2300	3,360	21	3,350	18	4,580	16
2300	3,280	20	3,420	19	4,560	9.5
2350	2,500	2	2,545	6.5	—	—
2350	2,600	8	2,660	7	—	—
2400	685	1	439	0	3,030	6
2400	—	—	—	—	3,090	5

*2-in. gage length

All material in annealed condition sheet and held at test temp. for 15 minutes before loading

2.) The large cone is fabricated from 0.505 in. N-155. The smaller inner cone is fabricated from 310 stainless steel. They are spun or rolled into shape and fusion welded together.

The flame step is the hottest area of the flameholder and the point where scaling and differential thermal expansion resulting in high thermal stresses are critical design considerations. Present practice is to machine the step from a 310 stainless steel rolled ring forging into an annular cup shape to reduce thermal stresses.

Cooling air from the turbine exhaust (at 1200° F) is passed along the inside walls of the sheet metal cones to keep them cool and at a more uniform temperature. Hastelloy X is being considered for present 310 stainless steel components of flameholders to take advantage of its greater strength at temperatures around 2000° F and scaling resistance equal to the 25-per-cent chromium type 310.

Expansion—In general, a low coefficient of expansion is desired. However, equally important in the case of dissimilar metal joints is an equal coefficient of thermal expansion.

We see this in the segments of an afterburner nozzle which must be capable of withstanding operating temperatures of 1800 to 1900° F with local hot spots reaching 2000° F. The segments must resist oxidation by hot combustion gases, and withstand loads that can warp the individual segments out of line with their neighbors and affect the operation of the nozzle as a whole. (Fig. 3.)

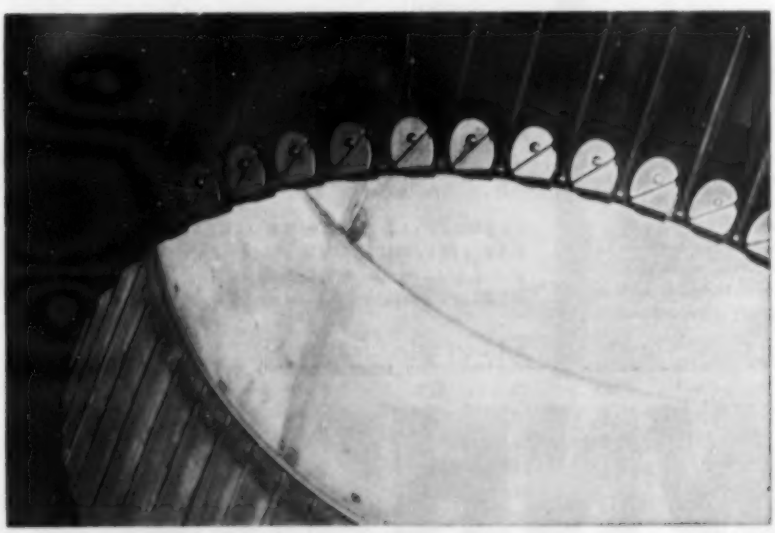


Fig. 3—Segment-type afterburner exit nozzle

The concluding section of this article will appear in the next issue of STEEL.

announcing

America's first and only rubber-tired diesel electric cranes

electric travel, electric rotation!
25 to 60 ton capacities!

Designed and built by Industrial Brownhoist Corporation for mines, quarries, railroads, steel mills, the lumber industry and other large manufacturing plants that require mobile materials handling equipment in heavy duty capacities, America's first Diesel Electric Wagon Crane is now in production. Available in capacities from 25 to 60 tons, the new wagon crane will be equipped with dynamatic clutch, anti-friction bearings at essential points, and power steering. It employs electric travel and electric rotation. Mounted on a 12-wheel crane carrier capable of speeds up to 8 miles per hour, the unit can be operated by one man from easy-to-reach crane and carrier controls. Rigorous tests indicate that the new machine provides economical operation and insures added savings of time and labor in heavy duty materials handling work. For complete details, consult a Brownhoist representative or write us today.

BROWNHOIST MATERIALS
HANDLING EQUIPMENT
GIVES A LIFT TO
AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN DISTRICT OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, Chicago, Denver, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

DIVISION OF Penn-Texas

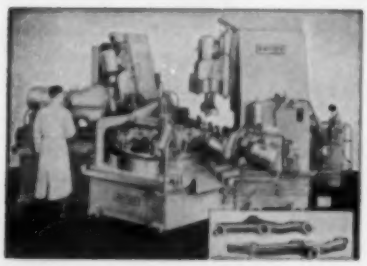
179

BROWNHOIST

NEW PRODUCTS and equipment

Write directly to the company listed for more information

Machine Processes Automotive Exhaust Manifolds



This 6-station machine mills and drills holes in the joint faces of a 21-in. casting and mills and taps holes in the exhaust flange. Loaded with joint faces up, the part rests on pads at either end and back against stops. The exhaust flange neck is placed in a V-block for endwise location. Jacks supporting the part are hydraulically operated.

The carbide milling cutters operate at 250 sfm, the high-speed steel drills at 80 sfm. The 60-in. index table carrying the six work-holding fixtures is operated automatically by a fluid-drive mechanism. The machine cycle is automatic. Electrically interlocked throughout, its base is of welded construction and is ribbed for rigidity and thoroughly normalized. Required floor space is 140 x 183 in. The work cycle is 25 seconds. Production is 115 pieces an hour at 80 per cent efficiency. Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich.

Broaching Machine Equipped with Four Stations

The PD-7-60-72 60-ton 72-in. stroke hydraulic pull-down machine broaches the internal spline and sizes the hole in over 30 sleeve-yoke parts. Two 40-hp motors provide the power. Manual control levers are on the broach pull head. The machine can be loaded during broaching.

The operator loads manually, then pushes dual-safety control buttons to start the cycle. The shuttle unit moves in to broaching position; broaches move down, connect with the pull heads and are pulled through, broaching the parts. As soon as the stroke has started, the shuttle unit returns, allowing the operator to reload. After broaching, the parts are automatically ejected below and the cycle repeats. American Broach & Machine Co., 415 W. Huron St., Ann Arbor, Mich.

Universal, Combination Arc Welder with AC and/or DC Welding Current

The Idealarc permits selection of ac or dc and a soft or forceful arc. The machine is available in several combinations—as an ac welder to which a dc package can be attached or a combination ac and dc machine, with selection of either current. Different output capacities of dc and ac can be combined to fit the machine to the job requirements.

Both voltage and amperage are controlled to give the desired arc characteristics for ac welding jobs. An Arc Booster switch allows selection of normal or hot starting. For dc welding, current is through heavy-duty rectifiers. Dual control of the arc and the Arc Booster are also provided. Models are available in 300, 400 and 500 amp ac, 200, 300, 375 and 450 amp dc capacities. Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, O.

Safety Hats Feature Pneumatic Headband Cushion and Geodetic Suspension

Geodetic crown suspension distributes the force of a blow evenly over a large area of the head, minimizing its effects. A headband cushion consists of a series of 12 vinyl-plastic air cells between the sweat band and the shell of the hat. Its function is to resist and distribute the impact of lateral blows on the perimeter of the head. The absorption and distribution is accomplished by the incorporation of small orifices between the air cells.

The pneumatic feature provides a comfortable cushion-fit on the head. Adjustment for size is accomplished by regulating the amount of air in the pneumatic structure by a self-sealing valve. The hats are made of Fiberglas reinforced resins. They are available in five colors. Willson Products Inc., Reading, Pa.

Self-contained, Vacuum-tube Voltmeter for Peak-to-peak Measurement

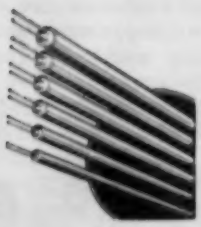
Battery operated, Model 982 is completely isolated from spurious response due to stray ac fields and circulating ground currents. Peak-to-peak measurement, with an input impedance of 10 megohm shunted by 15 micromicrofarads, prevents circuit loading. One shielded lead is used for all measurements. A range function switch makes negative and positive dc potentials measurable directly. Weston Electrical Instrument Corp., Newark, N. J.

Floor Resurfacing Material is Easy to Use

Swift-Floor Medium is uniform because of precision production. Scientifically sized granules knit together rapidly. Cryptolite allows it to adhere and bind, plus adding to floor strength (floors will withstand 50,000-lb loads 60 seconds after application). A solid base is achieved with less rolling or tamping. This is important in areas where traffic is irregular and loads are not heavy enough to immediately compress the floor material.

The material also can be used for floor patching. It can be applied over wood, concrete, brick or steel, indoors or out. The material can be feather-edged or pitched to a drain. Monroe Co. Inc., 10703 Quebec Ave., Cleveland 6, O.

Wire is Insulated by Magnesia in a Metal Sheath



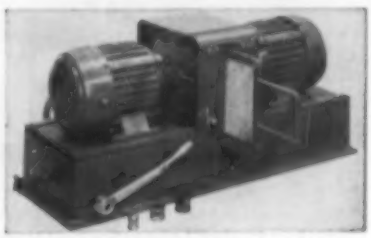
The outside diameters of the sheath surrounding the wires (one or more) are from 0.04 to 0.32 in. The sheath and magnesia insulation creates a gas-tight unit which resists heat, shock and vibration. It is available in a variety of sheath metals with thermocouples and other wire materials.

The assembly may be bent to installation requirement. Mounting flanges can be welded to the sheath without destroying the insulation. This method offers sizes considerably smaller than other 2000°F insulations in use. The material is being used successfully under conditions of heavy thermal shock and high vibration in aircraft installations. Aero-Research Instrument Co., 1901 N. Hermitage Ave., Chicago 22, Ill.

Grinder Used for Small, Large Production Runs

This double-end disc type grinds both ends of compression springs simultaneously to a squareness of grinding which is usually within 2 degrees. An adjustable stop at the left end can be set to control the wheel travel to hold the spring lengths within a few thousandths of an inch. OD capacity is ⅛ to 1½-in.; lengths from ⅛ to 4½-in. The speed of grinding varies with size and quantity of springs inserted in the frame.

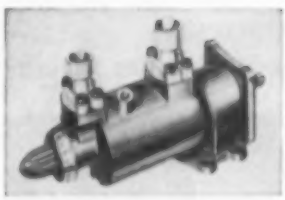
Two 1-hp 1800-rpm motors have special thrust bearings and individual starters. Two standard steel-back nut-inserted aluminum-oxide abrasive discs (with no hole in the center and no perforations) are supplied. They are 10 in. in diameter and 1 in. thick. Size is 13½ x 17 x 38 in.; net weight is 300 lb. Carlson Co., 227 Broadway, New York 7, N. Y.



Pressure Pumps for Hydraulic Systems

Series PVM-600 pumps are equipped with handwheel control for manual adjustment of output. They use a pressure-compensated control for automatic regulation of pressure and flow. Generating continuous duty pressure up to 5000 psi, they deliver 3 gpm at 1200 rpm. At maximum continuous speed of 2000 rpm (and full-rated pressure) they deliver 4 gpm and provide over 11 hydraulic hp.

The pumps are of the axial-piston type. They have nine equally spaced pistons in a fixed cylinder block. Torque applied to the drive shaft is converted by a drive cam to produce reciprocating motion of the pistons. The pumps are not affected by variations in inlet pressure or by the fluid temperature. Dudco Div., New York Air Brake Co., 1700 E. Nine Mile Rd., Hazel Park, Mich.



Panel Board for Remote Control of Fuse Cavity Drilling Machine

The type control adds safety to this four-spindle, vertical fuse machine. The panel board enables an operator to monitor the tool positions of the drilling machine's feed and indexing cycles. The panel's upper section contains pilot lamps indicating the relative positions of various machine parts. Push buttons and selector switches, mounted on a lower section, control the operation. It automatically drills 1.870-in. cavities in detonator ends of ammunition shells.

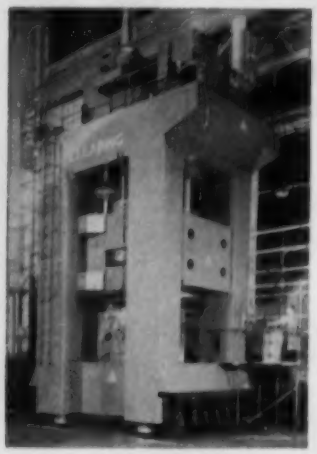
Explosion-proof and dust-tight condulets protect electrical circuits and apparatus from the presence of fumes and explosive dust particles. A type EJB junction box and several GUA condulets protect terminal connections and wiring. Crouse-Hinds Co., Wolf & Seventh North Sts., Syracuse, N.Y.

Switch Uses Snap-acting Spring Principle

It is designed for mobile, marine and aircraft applications where small, light and environment-proof construction is required. Completely sealed, it will operate in temperatures from −65 to 180° F. Tests indicate a minimum mechanical life expectancy of 300,000 operations.

The tentative electrical rating of the ISEI is: 30 v dc, 2.5 amp inductive, 4 amp resistive; maximum inrush is 15 amp. Operating characteristics are: Operating force, 5 to 17 oz; release force, 4 oz min; differential travel, 0.004 in. max; overtravel, 0.003 in. min. Micro-Switch, division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Hydraulic Press Trims Massive Aluminum Forgings



Shown here in a trial run,, it was designed for trimming massive aluminum forgings. Continuous pressure is exerted over an unusually long stroke, which is easily adjusted. The machine is of the housing type, with preloaded tie-rod frame construction. This type is said to best resist the effects of off-center loading which is a standard condition of operation in trimming work.

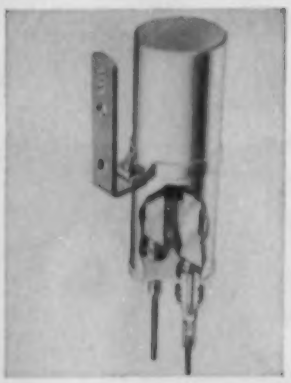
A system for taking care of break-through shock is built in. When the slide presses through work, it also presses against a cushion cylinder. The cushion cylinder, designed to withstand full press tonnage, reduces the pressure setting by exhausting its volume through a fixed orifice. When the slide breaks through the work, the hydraulic system is decompressed slightly. The cushion restrains the movement of the slide as it attempts to accelerate and continue its stroke. Clearing Machine Corp., division, U. S. Industries Inc., 6499 W. 65th St., Chicago 38, Ill.

Fork-lift Unit Has Capacity Increased to 6-ft Limit

Capacity of the Model S-10 Moto-Bug unit has been increased to 6 ft. Standard 20-in. heavy-duty forks fitted to it are adjustable in widths from 6 to 32 in. It has an easily interchanged front-end attachment. Forks tilt to the rear when raising loads to assure better load balance. The machine has a rated lift capacity of 1000 lb at 15-in. load center, 1515 lb at 6-in. load center. The lifting unit is a power-driven hydraulic pump.

It has a 61-in. turning radius and is 33 in. wide. A large steering wheel is connected to dual rear wheels through a 3.6 to 1 gear reduction. V-belt and roller-chain power transmission from a standard 6-hp gasoline engine is through an automotive-type differential for two-wheel drive. Internal expanding brakes are automatically applied for dead-man safety control. A directional transmission provides full power forward and reverse Kwik-Mix Co., subsidiary, Koehring Co., Sales Dept., Milwaukee 16, Wis.

Capacitor for Secondary Distribution Circuits



A 5-kvar, single-phase, 240-volt capacitor can be mounted with terminals either up or down. Each capacitor is supplied with a galvanized steel bracket for direct pole mounting. An adapter converts the pole bracket into a standard EEI-NEMA cross-arm bracket.

Terminal-mounted fuses co-ordinated with the power capacitor are available. An aluminum case construction protects against atmospheric corrosion. Two insulated leads 48 in. long permit easy connection to residential feeders. It weighs 25 lb. The length from the bottom of the casing to the tip of the terminal is 26 7/16-in., diameter is 4 5/16-in. Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, Pa.

NEW Literature

Write directly to the company for a copy

Automation

"Sectionized Automation by Cross" deals with the division of a machine into sections, any one of which can be shut down while the others remain in automatic operation—14 pages. Cross Co., Detroit 7, Mich.

Furnace Control

This system of hydraulically positioning arc furnace electrodes is explained—Bulletin No. 162, 4 pages. Askania Regulator Co., 240 E. Ontario St., Chicago 11, Ill.

Washers

"Spring Lock Washers — Their Engineering Principles" discusses parts held together tightly by the compressive force of bolts and nuts or screws. — 16 pages. Spring Washer Institute, 74 Trinity Place. New York 6, N. Y.

Metal Lathing, Furring

All types of metal-lathe construction are covered in "Specifications for Metal Lathing and Furring." Specifications are included —19 pages. Metal Lath Manufacturers Assoc., Engineers Bldg., Cleveland, O.

Steel Shelving

Photographs, cartoons and text outline the advantages of Hallowell adjustable steel shelving—4 pages. Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

Materials Handling

The company's materials handling equipment (ranging from extra-heavy-duty trailers with 250,000-lb capacities to motorized transfer cars, skid platforms, standard and collapsible storage containers) is described and illustrated—Bulletin No. EE-C, 8 pages. Phillips Corp., 14 Arch St., Carnegie, Pa.

Titanium Tubing

"Titanium, New Member of the Family of Metals" presents up-to-date information on the fabrication of unalloyed titanium tubing —Bulletin No. 43, 8 pages. Superior Tube Co., 1585 Germantown Pike, Norristown, Pa.

Broaching Machines

Single-ram surface broaching machines are described. A blueprint-type line drawing shows all three views of a typical machine. Construction details and features shown in photos are keyed to the text. — Bulletin RS-54, 4 pages. Colonial Broach Co., 925 Book Bldg., Detroit 26, Mich.

Luminous Ceilings

"Acusti-Luminus Ceiling — The Ceiling That Works for You" relates their increasing use to light offices, stores, industrial areas, drafting rooms and financial institutions—15 pages. Luminous Ceilings Inc., 2500 W. North Ave., Chicago 47, Ill.

Gear Stock

Specifications and prices on over 8000 stock items, including gears, sprockets, chains and splines are offered. The series 1600 universal drilling units, dust collectors, coolant systems, grinders and related manufactured items are described — 200 pages. Universal Gear Works, 1301 E. McNichols, Detroit 3, Mich.

V-belts

A "Master Engineering Manual" presents the scientific and simplified method for rating v-belts. Each popular 60-cycle motor speed, with complete drive selection, is shown on separate pages—Book No. V-1400-E2F, 100 pages. Worthington Corp., Mechanical Power Transmission Division, Oil City, Pa.

Recording Systems

The 150 series oscillographic recording systems and components are illustrated and detailed. Specifications are given—6 pages. Sanborn Co., Industrial Division, 195 Massachusetts Ave., Cambridge 39, Mass.

EDITORIAL REPRINTS:

Write Readers' Service, STEEL, Penton Bldg., Cleveland 13, O.

Gas-shielded Welding

Researchers have found a way to put carbon dioxide to work as a replacement for argon and helium-shielding gases. Welding engineers are happy with its prospects for the inert-gas processes. On p. 68, you'll find out why.

Heat Treating

Part II of the Water Hardening Type Series deals with quenching and tempering tool steels, p. 72.

Heat King

Part I of a two-part article, p. 86, says there is room for improvement in high temperature materials. Here's how we stand today.

Dust Control

Outside air is stripped of dust particles by electronic precipitators and circulated through the motor room at the Fairless Works. Heat is generated by driving motors and auxiliary electric equipment, p. 82.

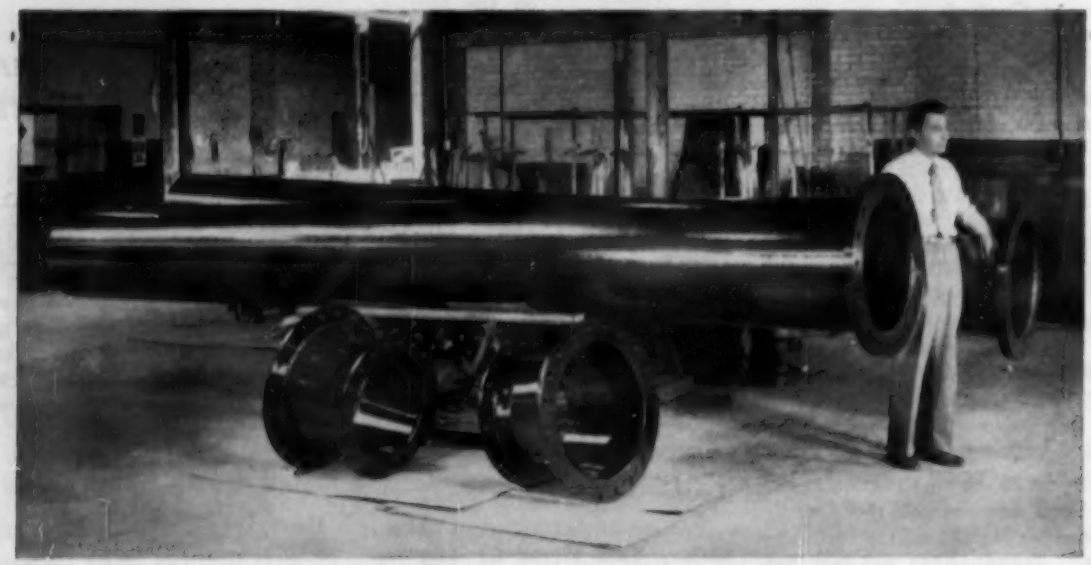
MARKET OUTL
OUTLOOK MA
MARKET OUTL
OUTLOOK MA

HERESITE

REG. U. S. PAT. OFF.

Baking Type **PHENOLIC OIL FREE COATINGS** **Self-Curing Type**

Innumerable applications of HERESITE will testify to the protection against practically all metal corroding substances as well as assuring production free of metal contamination. In most cases continuous operating temperatures of 400° F. have no effect on HERESITE baking type coatings. The exceptional high resistance and ability to withstand thermal-shock, vibration and elevated temperature make HERESITE coatings ideal for applications to various equipment.



Illustrated above are 24" dia. x 20' long HERESITE processed pipe which are to be placed in underground service.

HERECROL

REG. U. S. PAT. OFF.

Our SYNTHETIC RUBBER available in SHEET FORM and as a LIQUID COATING for protection of steel.

HERESITE & CHEMICAL COMPANY

MANITOWOC, WISCONSIN

Branch office: 327 South LaSalle Street, Chicago, Illinois

STEEL
January 31, 1955

Market Outlook

WHEN the *Frederic A. Eilers* sailed the other day from Port Richmond, Philadelphia, it looked like just another departing ship. But it means a lot to you!

The cargo included 10,000 tons of Canadian steel slabs destined for Holland. Similar shipments of United States slabs and billets are reported being made to Germany.

WHAT IT MEANS— This is the first time in a long while that American semifinished steel has gone abroad. Significance: Business in foreign countries is good. And it's a commonly accepted belief that when business abroad is good there will be no severe economic dip in the U. S.

The foreign steel business is so good that Europeans are inquiring in the United States for finished steel in addition to semifinished. One of the products they are interested in is plates. What a contrast! Only a few months ago European plates were offered in the U. S. at prices well below the domestic market.

CAUSE AND EFFECT— You can see effects in the pig iron and scrap markets, too. Importations of foreign iron into the U. S. are virtually nonexistent now, for the foreign countries need all of their own iron. The need for scrap for the foreign iron and steel industries continues to put their buyers into our markets. This, along with increased domestic demand, is reflected in bullish tendencies on the seacoasts, particularly the Atlantic.

PRICE RESPONSE— Activity in the coastal scrap markets more than offset price declines in the interior and pushed STEEL's price composite on steelmaking grades to $35.25 a gross ton, a rise of 50 cents over the preceding week.

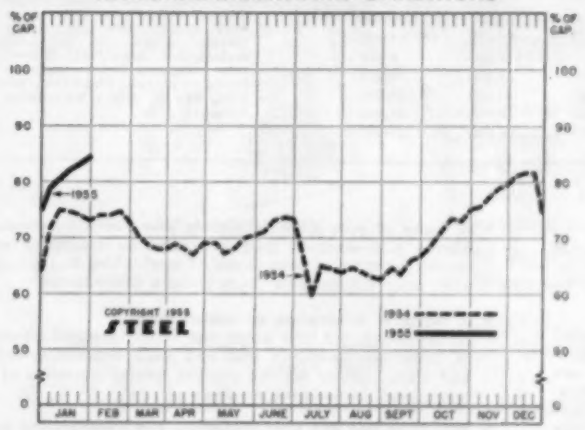
The clue that business in the U. S. will remain strong is timely in its arrival: Many people are wondering how strong the steel business will be come midyear. The automobile industry—biggest user of steel—is said to be in a production push in anticipation of a possible strike of auto workers at the end of May.

IN DEMAND— Forms of steel in strongest demand are the light, flat-rolled products. This is partly because the automobile industry is drawing heavily upon cold-rolled carbon sheets. Other flat-rolled items in strong demand include galvanized and enameling sheets.

OTHER SUPPORTS— Even if the automobile industry is hit by a strike or produces the majority of its 1955 outturn in the first half, there are other industries that promise to uphold business: About 14,000 miles of pipelines to carry oil, gasoline and natural gas will be laid in the U. S. this year, compared with 11,000 miles last year, says G. Austin Manuel, Pittsburgh, the president of Pipe Line Contractors Association. The 1953 mileage was valued at $170 million. Well drilling is scheduled to continue at a high rate, and today's wells are markets for increasing amounts of steel. Wells must go deeper to find oil. Construction is being counted on heavily for business support.

NOTEWORTHY— Right now steel output is the highest since mid-November, 1953. Production of steel for ingots and castings in the week ended Jan. 30 totaled 2,039,000 net tons. This was at the rate of 84.5 per cent of today's record capacity. A week earlier, the rate was 83.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Jan. 30	Change	Same Week 1954	Same Week 1953
Pittsburgh	80.5	+ 0.5*	58	108.5
Chicago	88	0*	83.5	100.5
Mid-Atlantic	78	+ 1	61	95
Youngstown	68	0	70	106
Wheeling	94.5	— 1	73	101
Cleveland	90	+ 3*	83	97
Buffalo	100	0	71	106
Birmingham	74	0	87	94
New England	70	0	60	95
Cincinnati	95	+ 13.5	71.5	95.5
St. Louis	87.5	0	48	101
Detroit	91	+ 2	83.5	101.5
Western	88	+ 4	79	107
National Rate	84.5	+ 1.5	73	99.5

INGOT PRODUCTION‡

	Week Ended Jan. 30	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	126.2†	125.0	115.2	113.2
NET TONS (In thousands)	2,027†	2,008	1,850	1,802

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,275 in 1955; 2,384,549 in 1954; 2,254,450 in 1953.

Metalworking Outlook—p. 31 Technical Outlook—p. 67

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Jan. 25 1956	Jan. 18 1955	Month Ago	Dec. Average
(1947-1949=100)	144.7	144.7	144.6	144.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 25

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extra and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525	Sheets, electrical	$9.350
Rails, light, 40 lb	5.917	Strip, C.R., carbon	7.493
Tie Plates	5.275	Strip, C.R., stainless, 420 (lb)	0.415
Axles, railway	7.500	Strip, H.R., carbon	5.113
Wheels, freight car, 33 in. (per wheel)	45.500	Pipe, black, buttweld (100 ft)	15.000
Plates, carbon	4.675	Pipe, galv., buttweld (100 ft)	18.600
Structural Shapes	4.517	Pipe, line (100 ft)	146.804
Bars, tool steel, carbon (lb)	0.450	Casing, oil well, carbon (100 ft)	154.214
Bars, tool steel, alloy, oil hardening die (lb)	0.525	Casing, oil well, alloy (100 ft)	227.875
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.960 (lb)	1.115	Tubes, boiler (100 ft)	‡
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610	Tubing, mechanical, carbon	‡
Bars, H.R., alloy	5.675	Tubing, mechanical, stainless, 304 (100 ft)	161.193
Bars, H.R., stainless, 302 (lb)	0.423	Tin plate, hot-dipped, 1.25 lb	8.533
Bars, H.R., carbon	5.000	Tin plate, electrolytic, 0.25 lb	7.223
Bars, reinforcing	4.963	Black plate, can making quality	6.233
Bars, C.F., carbon	6.180	Wire, drawn, carbon	7.908
Bars, C.F., alloy	11.375	Wire, drawn, stainless, 430 (lb)	0.545
Bars, C.F., stainless, 302 (lb)	0.438	Bale ties (bundle)	5.860
Sheets, H.R., carbon	4.670	Nails, wire, 8d common	7.815
Sheets, C.R., carbon	5.884	Wire, barbed (80-rod spool)	7.097
Sheets, galvanized	7.220	Woven wire fence (20-rod roll)	16.815
Sheets, C.R., stainless, 302 (lb)	0.553		

‡Not available

STEEL's FINISHED STEEL PRICE INDEX*

	Jan. 26 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.53	194.53	194.53	189.74	156.13
Index in cents per lb.	5.270	5.270	5.270	5.140	4.230

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.82	$117.82	$117.95	$113.91	$93.00
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.22
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.72
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	35.25	34.75†	32.63	38.17	26.83

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Jan. 26 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.45
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.45
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	5.302	3.93
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	4.10-4.15
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.40
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.40
Shapes, deld. Philadelphia	4.53	4.53	4.53	4.38	3.42
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.50
Plates, Chicago	4.225	4.225	4.225	4.10	3.50
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.60
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.50
Plates, Claymont, Del.	4.225	4.225	4.225	4.65	3.60
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.35
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.35
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.30
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.425	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45	4.15
Strip, C.R., Chicago	5.85	5.85	5.85	5.70	4.30
Strip, C.R., Detroit	5.90	5.90	5.90	5.45-6.05	4.35-.40
Wire, Basic, Pitts.	5.75	5.75	5.75	5.525	4.50
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.55	5.30
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$63.00
Wire rods, ¼-⅝" Pitts.	4.675	4.675	4.675	4.525	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	55.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	59.66	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	55.16	55.16	55.16	60.16	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38-42.38
No. 2 Fdry (Birm.) deld. Cin.	60.88	60.88	60.88	60.43	46.06
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$35.75	$35.75*	$32.50	$30.50	$30.00
No. 1 Heavy Melt, E. Pa.	36.00	33.50	32.00	27.00	23.00
No. 1 Heavy Melt, Chicago	34.00	35.00	34.00	27.00	27.50
No. 1 Heavy Melt, Valley	36.50	36.50	34.50	29.50	30.25
No. 1 Heavy Melt, Cleve.	33.50	33.50	32.50	28.50	27.25
No. 1 Heavy Melt, Buffalo	30.50	30.50	30.50	25.00	27.75
Rails, Rerolling, Chicago	49.50	53.00	53.00	38.00	39.50
No. 1 Cast, Chicago	40.00	40.00	40.00	32.50	36.50

*Revised.

COKE, Net Ton

Beehive, Furn, Connisvl.	$13.75	$13.75	$13.75	$14.75	$13.25
Beehive Fdry, Connisvl.	16.75	16.75	16.75	16.75	15.50
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

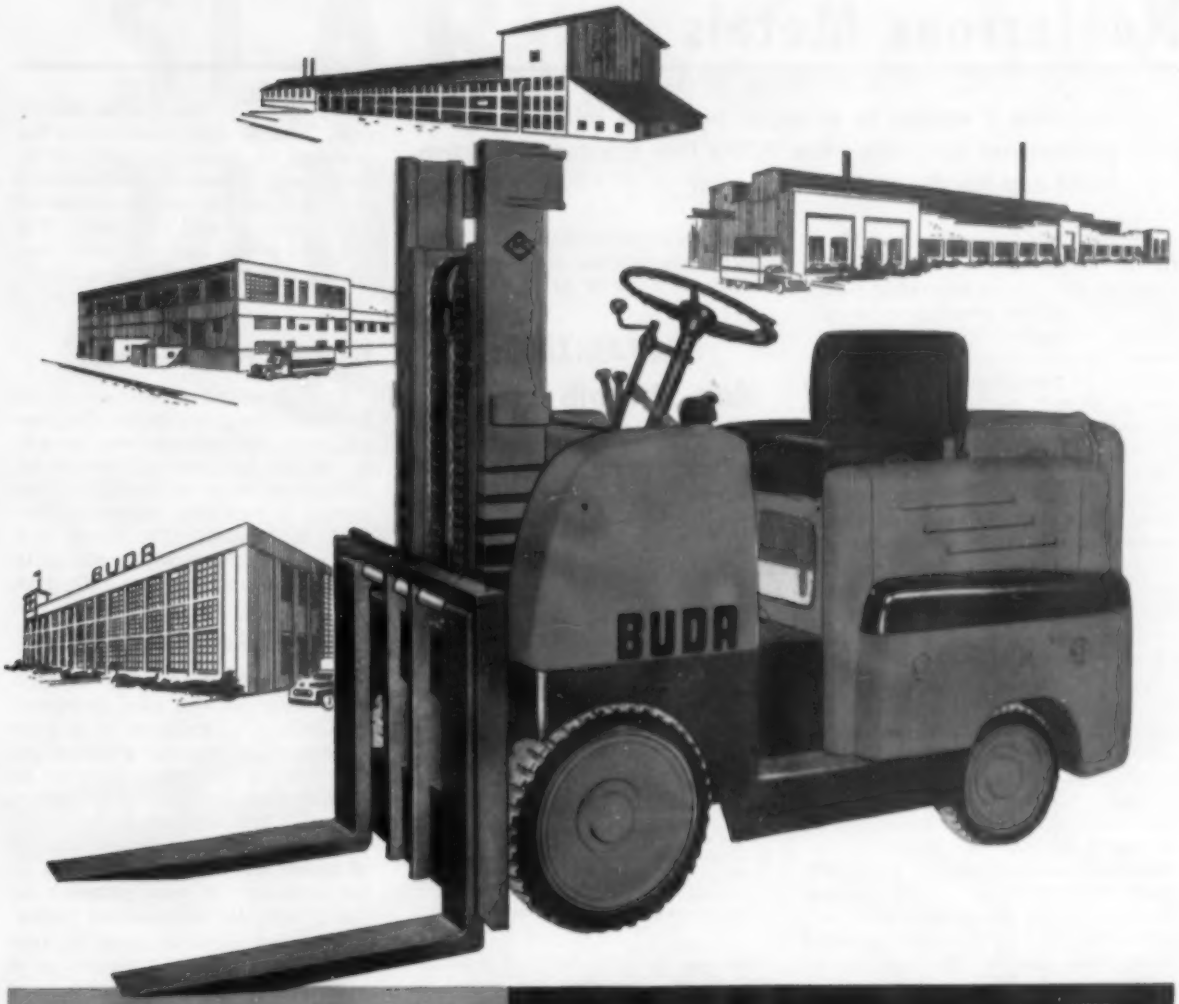
Daily Nonferrous Price Record

	Price Jan. 26	Last Change	Previous Price	Dec. Avg.	Nov. Avg.	Jan. 1954 Avg.
Copper	30.00	Apr. 12, 1954	29.75-30.00	30.000	30.000	29.750
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	13.060
Zinc	11.50	Sept. 3, 1954	11.00	11.500	11.500	9.780
Tin	88.75	Jan. 26, 1955	88.50	88.649	91.198	85.106
Nickel	64.50	Nov. 24, 1954	60.00	64.500	60.900	60.000
Aluminum	23.20	Jan. 12, 1955	22.20	22.200	22.200	21.600
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+%, deld.; Magnesium 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**



AS A DIVISION OF ALLIS-CHALMERS

BUDA

HAS THE MOST
MANUFACTURING RESOURCES
IN THE LIFT TRUCK FIELD

COMPLETE INFORMATION
. . . about the NEW Buda Fork Lift Truck gives all the facts and figures, puts you in the driver's seat. Send for your free copy today!

On call and at your service . . . the vast resources of one of the largest, most progressive manufacturing companies in the world! Only the BUDA Fork Lift Truck has behind it the tremendous facilities, the engineering "know-how," the minds, men and materials of an industrial giant like Allis-Chalmers. Only Buda offers one source responsibility for lift trucks . . . only Buda can offer you *positive* assurance of the finest in lift trucks.

THE BUDA DIVISION
Allis-Chalmers Manufacturing Company
Harvey, Illinois

Nonferrous Metals

An extra 2 million lb of nickel has been released by the government for civilian use in the first quarter. The action could end the shortage in the metal

Nonferrous Metal Prices, Pages 103 & 103

IS the nickel shortage over? That could be the logical conclusion from the action of the government in releasing 2 million lb of additional nickel for nondefense use in the first quarter of this year. A total of 48 million lb will be available to both defense and nondefense users.

This is the first direct action stemming from a report made by Business & Defense Services Administration, Department of Commerce, which contained several recommendations aimed at relieving the serious shortage of the metal since the Korean war. The report represents the first over-all reappraisal of the defense nickel situation in four or five years.

From Whence Cometh? — The source of this extra 2 million lb for nondefense use is not known for sure. It will not come from the metal already in stockpile, nor will the stockpile program suffer in the future, although the report recommends a scaling down to the 1954 level. Indications are that much of it will come from metal no longer needed for the military. Nondefense uses last year were 10 to 15 per cent greater than 1953, due to the drop-off in military consumption.

In addition, the Bureau of Mines says that "appreciable benefits are being realized from the expansion of nickel-producing facilities which have been under way during the past couple of years." As a result of these expansions, free-world production of nickel totaled about 188,000 short tons in 1954 and will total 200,000 tons in 1955, compared with 166,000 tons in 1953. This is in line with the upward trend of both the free-world and U. S. share of new nickel supplies in recent years. From a low of 225 million lb for the free world and 194 million lb for the U. S. in 1949, supply has risen to an expected 400 million lb for the free world and 290 million lb for the U. S. in 1955.

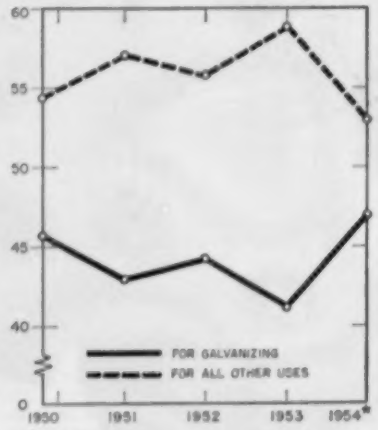
This represents an increase of one-third in the supply of nickel available to the U. S. In addition, the government has contractual obligations from International Nickel Co. for about 5 to 7 million lb for stockpile during 1955, making total availability between 295 million and 300 million lb for all uses this year.

Hook, Line and Nickel—The BDSA report and its recommendations were accepted completely by Arthur S. Flemming, Director of Defense Mobilization. It concludes that total industry requirements for nickel in 1955 will be "200 million lb as a minimum essential to maintenance of a reasonable level of industrial activity. As a growth industry, a level of 240-million-lb consumption by 1960 for nondefense business is desirable and attainable." It recommends that industry should be assured of a total supply of nickel to meet these goals.

"The consensus is that permanent damage to the nickel-consuming industries has resulted from the psychology of scarcity in connection with nickel supplies," the report says. The releasing of the 2 million additional pounds is the first step to undo that damage. The government is not disclosing how the 48 million lb will be allocated in first quarter—that is classified information—but if the civilian users fail to consume all of their share, the balance will revert to stockpile.

GALVANIZING: Main Strength for Zinc

(Per cent of total slab zinc consumption)



* Estimated.

Sources: U.S. Bureau of Mines, American Zinc Institute Inc.

Reynolds To Build Plant

Reynolds Metals Co. will construct a "sizable" aluminum products fabricating plant in the Pacific Northwest, John H. Krey, assistant to the president of Reynolds, told a Portland, Oreg., Chamber of Commerce meeting. Its site will be announced within six months, he said. The new mill might turn out cable, rod, aluminum foil, castings or a combination of them.

Tin Keeps Eye on Formosa

When President Eisenhower stated his Formosan policy before Congress last week, the response was immediate in the tin market. Straits tin sold at 88 cents in New York, the highest it had been since the first week in January. The threat of a hot war in China will continue to have a buoyant effect on tin prices.

Titanium Information Available

Information about some 70 titanium alloy systems, some previously unpublished, is available in a book entitled, *Constitution of Titanium Alloy Systems,* which was compiled by Battelle Memorial Institute, Columbus, O. The study contains phase diagrams and discussions of each of 48 binary and 22 ternary titanium alloy systems. It was gathered for the Wright Air Development Center.

The book contains about all that was known about the subject as of March, 1953, and is expected to be of special value to metallurgists in solving problems arising from the manufacture of titanium alloys and their heat treatment. It is available from the U. S. Department of Commerce, Washington 25, for $8.00.

Market Memos

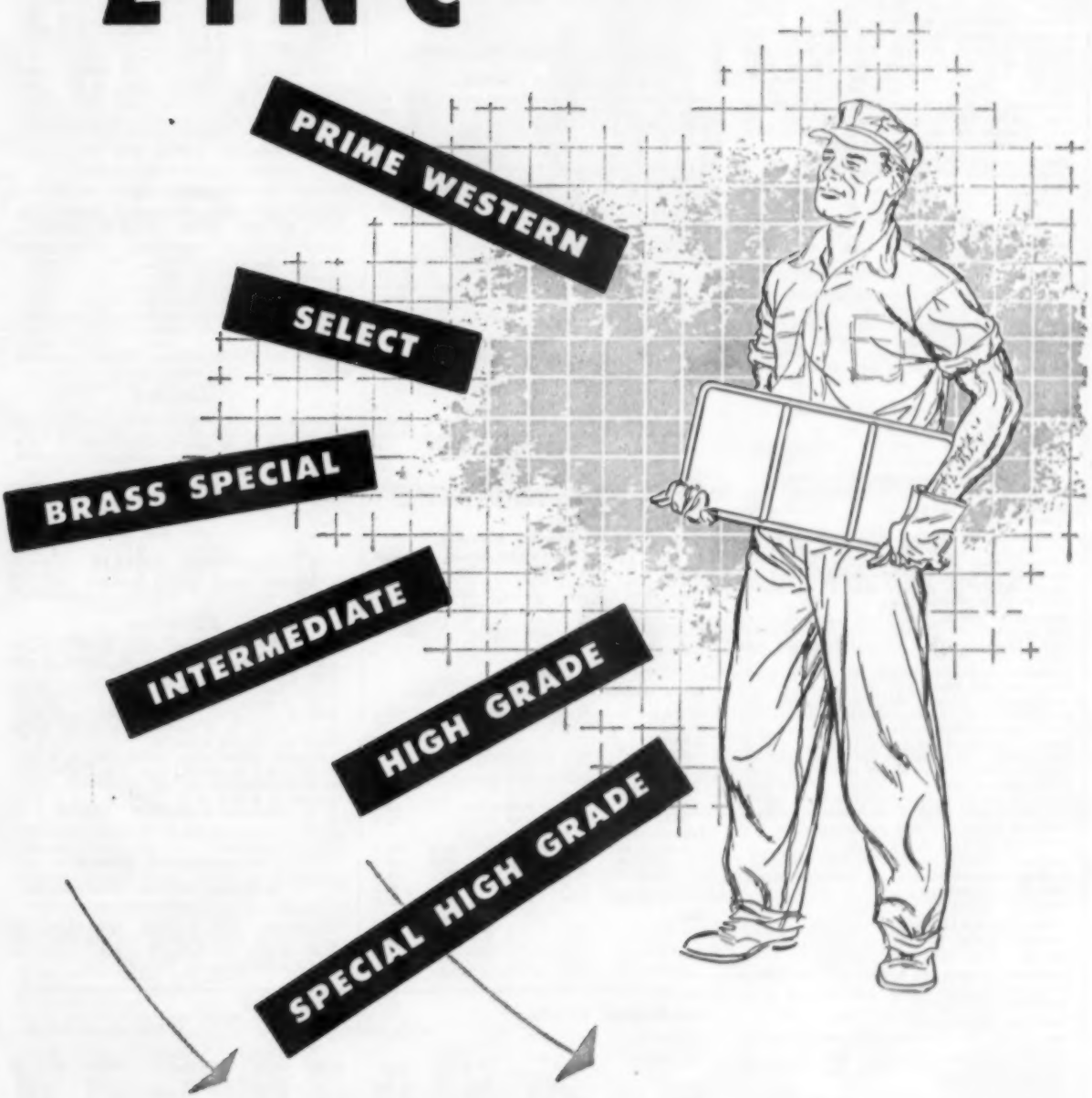
- According to the Aluminum Association, since 1939 the price of aluminum ingot has gone up only 11 per cent while prices of other nonferrous metals have risen an average of 140 per cent.
- Consumption of chromite in 1954 dropped to 906,000 tons from 1,336,000 tons in 1953; imports also declined. Stainless steels consumed 67 per cent of all chromium alloys and metal last year.
- Business & Defense Services Administration reports fourth quarter, 1954, production of titanium mill products was 768,566 lb, compared to 692,123 lb in the third quarter. Total 1954 production was 2,598,300 lb, compared to 2,227,500 lb in 1953.

SLAB ZINC

every grade of ZINC

for urgent military and

civilian requirements



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

Nonferrous Metals

An extra 2 million lb of nickel has been released by the government for civilian use in the first quarter. The action could end the shortage in the metal

Nonferrous Metal Prices, Pages 102 & 103

IS the nickel shortage over? That could be the logical conclusion from the action of the government in releasing 2 million lb of additional nickel for nondefense use in the first quarter of this year. A total of 48 million lb will be available to both defense and nondefense users.

This is the first direct action stemming from a report made by Business & Defense Services Administration, Department of Commerce, which contained several recommendations aimed at relieving the serious shortage of the metal since the Korean war. The report represents the first over-all reappraisal of the defense nickel situation in four or five years.

From Whence Cometh? — The source of this extra 2 million lb for nondefense use is not known for sure. It will not come from the metal already in stockpile, nor will the stockpile program suffer in the future, although the report recommends a scaling down to the 1954 level. Indications are that much of it will come from metal no longer needed for the military. Nondefense uses last year were 10 to 15 per cent greater than 1953, due to the drop-off in military consumption.

In addition, the Bureau of Mines says that "appreciable benefits are being realized from the expansion of nickel-producing facilities which have been under way during the past couple of years." As a result of these expansions, free-world production of nickel totaled about 188,000 short tons in 1954 and will total 200,000 tons in 1955, compared with 166,000 tons in 1953. This is in line with the upward trend of both the free-world and U. S. share of new nickel supplies in recent years. From a low of 225 million lb for the free world and 194 million lb for the U. S. in 1949, supply has risen to an expected 400 million lb for the free world and 290 million lb for the U. S. in 1955.

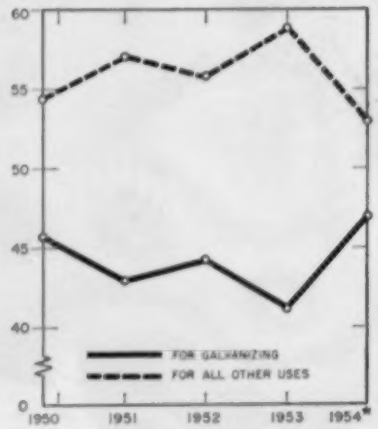
This represents an increase of one-third in the supply of nickel available to the U. S. In addition, the government has contractual obligations from International Nickel Co. for about 5 to 7 million lb for stockpile during 1955, making total availability between 295 million and 300 million lb for all uses this year.

Hook, Line and Nickel—The BDSA report and its recommendations were accepted completely by Arthur S. Flemming, Director of Defense Mobilization. It concludes that total industry requirements for nickel in 1955 will be "200 million lb as a minimum essential to maintenance of a reasonable level of industrial activity. As a growth industry, a level of 240-million-lb consumption by 1960 for nondefense business is desirable and attainable." It recommends that industry should be assured of a total supply of nickel to meet these goals.

"The consensus is that permanent damage to the nickel-consuming industries has resulted from the psychology of scarcity in connection with nickel supplies," the report says. The releasing of the 2 million additional pounds is the first step to undo that damage. The government is not disclosing how the 48 million lb will be allocated in first quarter—that is classified information—but if the civilian users fail to consume all of their share, the balance will revert to stockpile.

GALVANIZING: Main Strength for Zinc

(Per cent of total slab zinc consumption)



* Estimated.
Sources: U.S. Bureau of Mines; American Zinc Institute Inc.

Reynolds To Build Plant

Reynolds Metals Co. will construct a "sizable" aluminum products fabricating plant in the Pacific Northwest, John H. Krey, assistant to the president of Reynolds, told a Portland, Oreg., Chamber of Commerce meeting. Its site will be announced within six months, he said. The new mill might turn out cable, rod, aluminum foil, castings or a combination of them.

Tin Keeps Eye on Formosa

When President Eisenhower stated his Formosan policy before Congress last week, the response was immediate in the tin market. Straits tin sold at 88 cents in New York, the highest it had been since the first week in January. The threat of a hot war in China will continue to have a buoyant effect on tin prices.

Titanium Information Available

Information about some 70 titanium alloy systems, some previously unpublished, is available in a book entitled, *Constitution of Titanium Alloy Systems,* which was compiled by Battelle Memorial Institute, Columbus, O. The study contains phase diagrams and discussions of each of 48 binary and 22 ternary titanium alloy systems. It was gathered for the Wright Air Development Center.

The book contains about all that was known about the subject as of March, 1953, and is expected to be of special value to metallurgists in solving problems arising from the manufacture of titanium alloys and their heat treatment. It is available from the U. S. Department of Commerce, Washington 25, for $8.00.

Market Memos

- According to the Aluminum Association, since 1939 the price of aluminum ingot has gone up only 11 per cent while prices of other nonferrous metals have risen an average of 140 per cent.
- Consumption of chromite in 1954 dropped to 906,000 tons from 1,336,000 tons in 1953; imports also declined. Stainless steels consumed 67 per cent of all chromium alloys and metal last year.
- Business & Defense Services Administration reports fourth quarter, 1954, production of titanium mill products was 768,566 lb, compared to 692,123 lb in the third quarter. Total 1954 production was 2,598,300 lb, compared to 2,227,500 lb in 1953.

SLAB ZINC

every grade of ZINC
for urgent military and
civilian requirements

AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 23.20, pigs 21.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 25.00; No. 43, 5% Si, 24.8; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 26.3; No. 195, 4.5% Cu, 0.8% Si, 25.5; No. 214, 3.5% Mg, 28.2; No. 356, 7% Si, 0.3% Mg, 24.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 28.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.25 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 deld. Cons. Valley, 30.00 deld. Midwest; Lake 30.00 deld; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $110-$120 nom. per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $10-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J. and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more, f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $332-$335, per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3-$3.25 per lb; pressed ingot $4.00 per lb; sintered ingot $5.55 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 64.50; 10-lb pigs, unpacked 67.65; "XX" nickel shot 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $120-$140 nom. per troy oz.

Palladium: $17-$21 per troy oz.

Platinum: $78-$84 per troy oz from refineries.

Radium: $16-$21.60 per mg radium content, depending on quantity.

Rhodium: $120-$126 per troy oz.

Ruthenium: $50-$55 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 88.75, prompt 88.75.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max) $4.50, grade A-2 (0.5% Fe max) $4 per pound.

Tungsten: Powder, 98.5%, carbon reduced, 1000 lb lots $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb $5.10 nom.; 99 + % hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.55, special high grade 13.00, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 23.50-25.00; No. 12 foundry alloy (No. 2 grade) 23.25-24.00; 5% silicon alloy, 0.60 Cu max., 25.00-25.75; 13 alloy 0.60 Cu max., 25.00-25.75; 195 alloy 25.00-25.50; 108 alloy 24.00-24.50; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.75-26.00; grade 2, 24.00-25.00; grade 3, 23.00-24.00; grade 4, 22.25-23.00.

Brass Ingot: Red brass, No. 115, 31.50; tin bronze No. 225, 42.00; No. 245, 36.25; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 27.25; manganese bronze No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 31.00; AZ91B, 26.00; AZ91C, 31.00; AZ92A, 31.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.29; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more $20.00 per cwt; pipe, full coils $20.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $16; wire, $11; forging billets $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00; ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $30; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	63.5	62.0		
0.156-0.172	53.9	52.3		
0.188	53.9	52.3		66.8
0.219-0.234	51.1	49.5		
0.250-0.281	51.1	49.5		63.7
0.313	51.1	49.5		60.8
Cold-finished				
0.375-0.547	49.9	47.5	59.8	57.2
0.563-0.688	49.9	47.5	56.9	53.7
0.750-1.000	48.7	46.3	52.1	50.6
1.063	48.7	46.3		48.9
1.125-1.500	46.9	44.6	50.4	48.9
Rolled				
1.563	45.7	43.4		
1.625-2.000	45.1	42.8		47.2
2.125-2.500	44.0	41.7		
2.563-3.375	42.7	40.5		

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	35.9	40.4		
0.135-0.096	36.4	41.3		
0.095-0.077	37.1	42.3	34.6	39.6
0.076-0.061	37.7	43.2	34.8	39.8
0.060-0.048	38.2	43.6	35.1	40.2
0.047-0.038	38.7	44.5	35.6	40.6
0.037-0.030	39.1	45.0	36.0	41.3
0.029-0.024	39.7	45.5	36.3	41.8
0.023-0.019	40.4	46.9	37.1	42.6
0.018-0.017	41.2		37.7	43.5
0.016-0.015	42.1		38.5	44.7
0.014	43.1		39.5	46.0
0.013-0.012	44.3		40.2	47.0
0.011	45.3		41.4	48.6
0.010-0.0095	46.5		42.5	50.2
0.009-0.0085	47.8		44.0	52.3
0.008-0.0075	49.4		45.2	54.1
0.007	50.9		46.7	56.4
0.006	52.5		48.1	61.4

* 48 in. max. dia. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in 24-60 in. width or dia, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.6	38.5
5050-F	35.7	39.9
3004-F	36.7	41.6
5052-F	38.4	43.4
6061-T6	39.6	44.0
2024-T4*	41.8	47.9
7075-T6*	49.6	56.2

*24-48 in. widths or dia., 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 47.8-37.3, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 52.6-41 in random lengths 0.375-4.0 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size in.		Nom. pipe Size, in.	
⅜	$16.10	2	$ 49.55
1	25.35	4	136.65
1¼	34.30	6	244.90
1½	41.00	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ⅜ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 57.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ⅛-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings 15.00-15.50; old sheet 11.00-12.00; borings and turnings 7.50-8.50; pistons and struts 8.50-9.50; crankcases 11.00-12.00; industrial castings 11.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.76b	46.36c	....	48.83	26.000	26.000	25.250
Yellow Brass	42.27	42.21d	42.81	45.18	19.875	19.625	18.250
Red Brass, 85%	45.89	45.82	46.43	48.70	23.000	22.750	22.250
Low Brass, 80%	44.95	44.89	45.49	47.78	22.250	22.000	21.500
Naval Brass	48.39	40.76	53.43	49.85	18.500	18.250	17.750
Commercial Bronze, 90%	47.38	47.32	47.92	49.94	23.875	23.625	23.125
Nickel Silver, 10%	56.30	60.69g	56.63	....	24.35	24.00	12.125
Phosphor Bronze, A, 5%	67.31	67.81	67.81	68.96	26.500	26.250	25.250
Silicon Bronze	53.09	52.38	53.13	70.49e	25.125	24.875	24.125
Manganese Bronze	50.09	44.25	54.70	....	18.500	18.250	17.750
Muntz Metal	44.54	40.35	....	....	18.750	18.500	18.000

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 30,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire No. 1 26.75-28.00; No. 2 copper 25.75-26.50; light copper 23.75-24.50; No. 1 composition red brass 21.50-22.00; No. 1 composition turnings 20.50-21.50; mixed brass turnings 14.00-14.50; new brass clippings 18.00-20.00; No. 1 brass rod turnings 15.50-17.00; light brass 12.50-14.00; heavy yellow brass 16.00-16.50; new brass rod ends 17.00-18.00; auto radiators, unsweated 17.00-18.50; cocks and faucets 19.00-19.50; brass pipe 18.00-19.00.

Lead: Heavy 11.50-11.75; battery plate 6.00-6.50; linotype and stereotype 13.50-14.25; electrotype 12.00-12.50; mixed babbitt 12.00-12.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 15.50-16.50.

Monel: Clippings 28.00; old sheet 26.00; turnings 21; rods 28.00.

Nickel: Sheets and clips 50.00-57.00; rolled anodes 50.00-57.00; turnings 30.00-40.00; rod ends 50.00-57.00.

Tin: No. 1 pewter 50.00-55.00; block tin pipe 70.00-75.00; No. 1 babbitt 45.00.

Zinc: Old zinc, 4.75-5.50; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings 17.25-17.75; 3003 clippings 17.25-17.75; 6151 clippings 17.25-17.75; 5052 clippings 17.25-17.75; 2014 clippings 16.50-17.00; 2017 clippings 16.50-17.00; 2024 clippings 16.50-17.00; mixed clippings 16.50-17.00; old sheet 15.50-16.00; old cast 15.50-16.00; clean old cable (free of steel) 17.25-17.75; borings and turnings 15.50-16.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 30.50; No. 2 copper 29.00; light copper 27.50; refinery brass (60% copper) per dry copper content 26.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 30.00; No. 2 copper 28.50; light copper 27.00; No. 1 composition borings 24.50-24.75; No. 1 composition solids 25.00; heavy yellow brass solids 19.00-19.50; yellow brass turnings 18.50; radiators 20.25-20.50.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 5000-10,000 lb; electrodeposited 39.78, cast 42.04, 2000-5000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.075; 200-499 lb $1.06; 500-999 lb $1.055; 1000 lb or more $1.05.

Zinc: Bar 20.00, bar or flat top 19.00 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90; 1000 lb and over 61.90.

Copper Sulphate: 100-4000 lb 11.35; 4000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

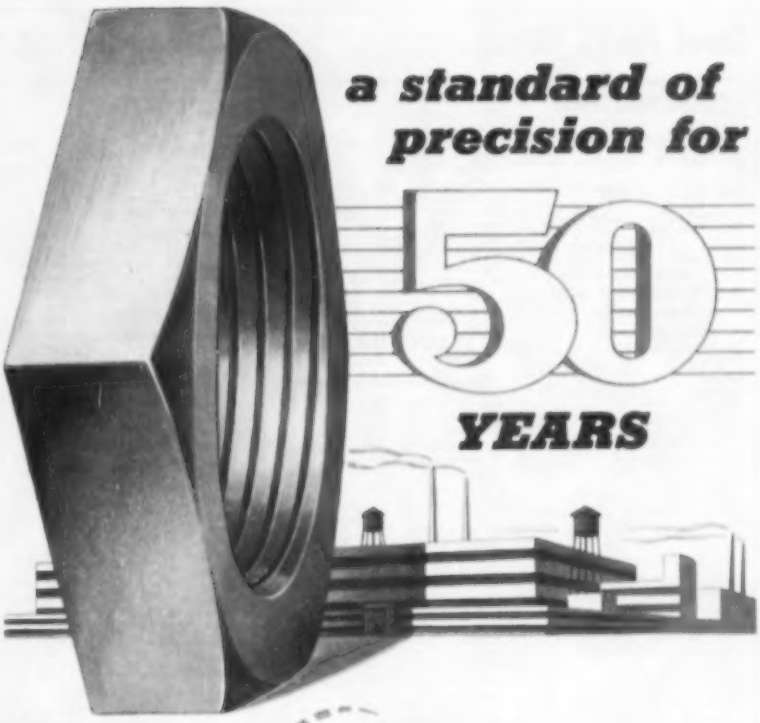
Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 69.2; 100-600 lb 55; 700-1900 lb 52.6; 2000-9900 lb 50.8; 10,000 lb or more 49.7.

Stannous Chloride (Anhydrous): Less than 50 lb $1.545; 50 lb $1.205; 100-300 lb $1.065; 400-900 lb $1.031; 1000-1900 lb $1.007; 2000-4900 lb 97; 5000-19,900 lb 90.9; 20,000 lb and over 84.8.

Stannous Sulphate: Less than 5 lb $1.246; 50 lb 94.6; 100-1900 lb 92.6; 2000 lb and over 90.6.

Zinc Cyanide: Under 1000 lb 54.30; 1000 lb and over 52.30.



a standard of precision for 50 YEARS

"Fischer Turned"

BRASS AND ALUMINUM NUTS

HEXAGON CAP NUTS

KNURLED THUMB NUTS

DOUBLE CHAMFERED HEXAGON NUTS

SINGLE CHAMFERED HEXAGON NUTS

Fifty years of manufacturing "know-how" stand behind Fischer brass and aluminum nuts. Combining this experience with special high-speed machinery, Fischer supplies precision *turned* nuts at prices competitive with those produced by other methods . . . cuts normal delivery time to absolute minimum.

New economies in assembly operations are possible with Fischer nuts because each is burrless . . . tapped square with the face . . . cleaned and degreased . . . countersunk on both sides . . . tapped to Class 2 tolerances.

Specify Fischer turned brass and aluminum nuts to fill all of your requirements. An extensive line of standard nuts is offered, and "specials" are produced with speed and economy . . . many types so regularly that they have virtually become "standards" at Fischer.

Write today for new complete catalog.

1905-1955 50th ANNIVERSARY FISCHER SPECIAL MFG. CO. CINCINNATI, OHIO

C-216-FS

Fischer SPECIAL MFG. CO.

476 MORGAN ST. • CINCINNATI 6, OHIO

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 23.20, pigs 21.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 12, 12% Si, 25.00; No. 43, 5% Si, 24.8; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 26.2; No. 195, 4.5% Cu, 0.8% Si, 25.5; No. 214, 3.8% Mg, 26.2; No. 356, 7% Si, 0.3% Mg, 24.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.25 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 deld. Conn. Valley, 30.00 deld. Midwest; Lake 30.00 deld; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $110-$120 nom. per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 95%, $10-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more, f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Fort Newark, N. J.

Mercury: Open market, spot, New York, $322-$325, per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3-$3.25 per lb; pressed ingot $4.00 per lb; sintered ingot $5.55 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 64.50; 10-lb pigs, unpacked 67.65; "XX" nickel shot 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $120-$140 nom. per troy oz.

Palladium: $17-$21 per troy oz.

Platinum: $78-$84 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $120-$125 per troy oz.

Ruthenium: $50-$55 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 85.75, prompt 85.75.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max) $4.50, grade A-2 (0.5% Fe max) $4 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb $5.10 nom.; 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 13.50, special high grade 13.00, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $10 per lb; powder electronics grade $18, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 23.50-25.00; No. 12 foundry alloy (No. 2 grade) 23.25-24.00; 5% silicon alloy, 0.60 Cu max., 25.00-25.75; 13 alloy 0.60 Cu max., 25.00-25.75; 195 alloy 25.00-25.50; 108 alloy 24.00-24.50; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.75-26.00; grade 2, 24.00-25.00; grade 3, 23.00-24.00; grade 4, 22.25-23.00.

Brass Ingot: Red brass, No. 115, 31.50; tin bronze No. 225, 42.00; No. 245, 36.25; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 27.25; manganese bronze No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 31.00; AZ91B, 36.00; AZ91C, 31.00; AZ92A, 31.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more $20.00 per cwt; pipe, full coils $20.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00; ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $37; H.R. strip $38; C.R. strip $35; forged or H.R. bars $37; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	98
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	63.5	62.0	...	...
0.156-0.172	53.9	52.3	...	...
0.188	53.9	52.3	...	66.8
0.219-0.234	51.1	49.5	...	...
0.250-0.281	51.1	49.5	...	63.7
0.313	51.1	49.5	...	60.8
Cold-finished				
0.375-0.547	49.9	47.5	59.8	57.2
0.563-0.688	49.9	47.5	56.9	53.7
0.750-1.000	48.7	46.3	53.1	50.6
1.063	48.7	46.3	...	48.9
1.125-1.500	46.9	44.6	50.4	48.9
Rolled				
1.563	45.7	43.4	...	...
1.625-2.000	45.1	42.8	...	47.2
2.125-2.500	44.0	41.7	...	...
2.563-3.375	42.7	40.5	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	35.9	40.4	...	...
0.135-0.096	36.4	41.3	...	...
0.095-0.077	37.1	42.3	34.6	39.6
0.076-0.061	37.7	43.2	34.8	39.8
0.060-0.048	38.2	43.6	35.1	40.2
0.047-0.038	38.7	44.5	35.6	40.6
0.037-0.030	39.1	45.0	36.0	41.3
0.029-0.024	39.7	45.5	36.3	41.8
0.023-0.019	40.4	46.9	37.1	42.6
0.018-0.017	41.2	...	37.7	43.5
0.016-0.015	42.1	...	38.5	44.7
0.014	43.1	...	39.5	46.0
0.013-0.012	44.3	...	40.2	47.0
0.011	45.3	...	41.4	48.6
0.010-0.0095	46.5	...	42.5	50.2
0.009-0.0085	47.8	...	44.0	52.3
0.008-0.0075	49.4	...	45.2	54.1
0.007	50.9	...	46.7	56.4
0.006	52.5	...	48.1	61.4

* 48 in. max. dia. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in. 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.6	38.5
5050-F	35.7	39.9
3004-F	36.7	41.6
5052-F	38.4	43.4
6061-T6	39.6	44.0
2024-T4*	41.5	47.9
7075-T6*	49.6	56.2

*24-48 in. widths or dia., 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 47.8-37.3 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 53.0-41 in random lengths 0.375-4.0 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size in.		Nom. pipe size, in.	
¾	$16.10	3	$ 49.55
1	25.35	4	136.65
1¼	34.30	6	264.90
1½	41.00	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 3 in. 67.80. I-Beams, 5 in. 85.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings 15.00-15.50; old sheet 11.00-12.00; borings and turnings 7.50-8.50; pistons and struts 8.50-9.50; crankcases 11.00-12.00; industrial castings 11.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.76b	46.36c	....	48.82	26.000	26.000	25.250
Yellow Brass	42.27	42.21d	42.81	45.15	19.875	19.625	18.250
Red Brass, 85%	45.89	45.83	46.43	48.70	23.000	22.750	21.250
Low Brass, 80%	44.95	44.89	45.49	47.76	22.250	22.000	21.500
Naval Brass	44.39	40.70	53.43	49.55	18.500	18.250	17.750
Commercial Bronze, 90%	47.38	47.32	47.92	49.94	23.875	23.625	23.125
Nickel Silver, 10%	56.30	60.65g	58.63	....	24.25	24.00	13.125
Phosphor Bronze, A, 5%	67.31	67.81	67.81	63.96	26.500	26.250	25.250
Silicon Bronze	53.09	52.28	53.13	70.49e	25.125	24.875	24.125
Manganese Bronze	50.09	44.25	54.70	....	18.500	18.250	17.750
Munts Metal	44.54	40.35	....	....	18.750	18.500	18.000

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire No. 1 26.75-28.00; No. 2 copper 25.75-26.50; light copper 23.75-24.50; No. 1 composition red brass 21.50-22.00; No. 1 composition turnings 20.50-21.50; mixed brass turnings 14.00-14.50; new brass clippings 18.00-20.00; No. 1 brass rod turnings 15.50-17.00; light brass 12.50-14.00; heavy yellow brass 16.00-16.50; new brass rod ends 17.00-18.00; auto radiators, unsweated 17.00-18.50; cocks and faucets 19.00-19.50; brass pipe 18.00-19.00.

Lead: Heavy 11.50-11.75; battery plate 6.00-6.50; linotype and stereotype 13.50-14.25; electrotype 12.00-12.50; mixed babbitt 12.00-12.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 15.50-16.50.

Monel: Clippings 26.00; old sheet 26.00; turnings 21; rods 28.00.

Nickel: Sheets and clips 50.00-57.00; rolled anodes 50.00-57.00; turnings 30.00-40.00; rod ends 50.00-57.00.

Tin: No. 1 pewter 50.00-55.00; block tin pipe 70.00-75.00; No. 1 babbitt 45.00.

Zinc: Old zinc, 4.75-5.50; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1160 clippings 17.25-17.75; 3003 clippings 17.25-17.75; 6151 clippings 17.25-17.75; 5052 clippings 17.25-17.75; 2014 clippings 16.50-17.00; 2017 clippings 16.50-17.00; 2024 clippings 16.50-17.00; mixed clippings 16.50-17.00; old sheet 15.50-16.00; old cast 15.50-16.00; clean old cable (free of steel) 17.25-17.75; borings and turnings 15.50-16.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 30.50; No. 2 copper 29.00; light copper 27.50; refinery brass (60% copper) per dry copper content 26.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 30.00; No. 2 copper 28.50; light copper 27.00; No. 1 composition borings 24.50-24.75; No. 1 composition solids 25.00; heavy yellow brass solids 19.00-19.50; yellow brass turnings 18.50; radiators 20.25-20.50.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 5000-10,000 lb; electrodeposited 39.78, cast 42.04, 2000-5000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.075; 200-499 lb $1.06; 500-999 lb $1.055; 1000 lb or more $1.05.

Zinc: Bar 20.00, bar or flat top 19.00 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90; 1000 lb and over 61.90.

Copper Sulphate: 100-5000 lb 11.35; 5000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

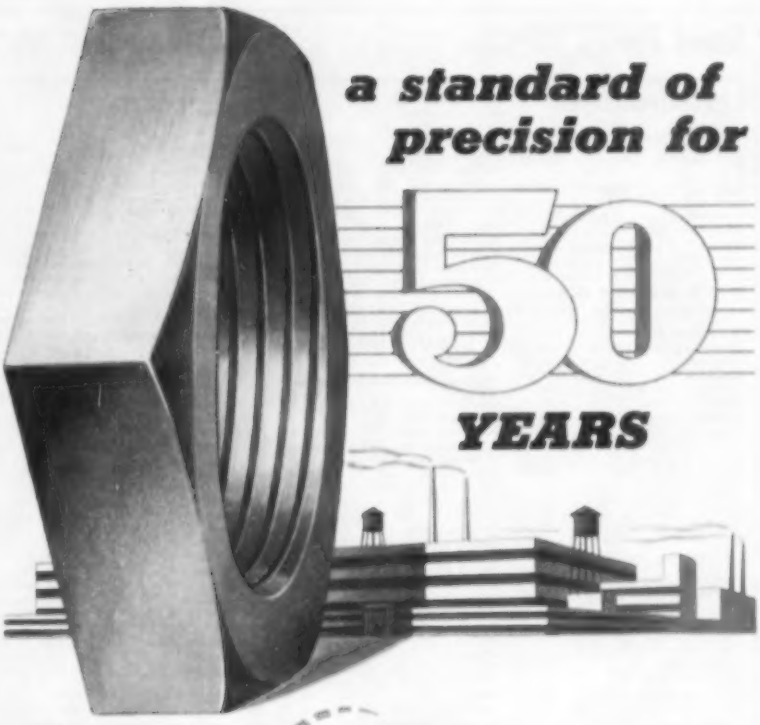
Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 69.2; 100-600 lb 55; 700-1900 lb 52.6; 2000-9900 lb 50.8; 10,000 lb or more 49.7.

Stannous Chloride (Anhydrous): Less than 50 lb $1.545; 50 lb $1.205; 100-300 lb $1.055; 400-900 lb $1.031; 1000-1900 lb $1.007; 2000-4900 lb 97; 5000-19,900 lb 99.9; 20,000 lb and over 84.8.

Stannous Sulphate: Less than 5 lb $1.246; 50 lb 94.6; 100-1900 lb 92.6; 2000 lb and over 90.6.

Zinc Cyanide: Under 1000 lb 54.30; 1000 lb and over 52.30.



a standard of precision for 50 YEARS

"Fischer Turned"

BRASS AND ALUMINUM NUTS

HEXAGON CAP NUTS

KNURLED THUMB NUTS

DOUBLE CHAMFERED HEXAGON NUTS

SINGLE CHAMFERED HEXAGON NUTS

Fifty years of manufacturing "know-how" stand behind Fischer brass and aluminum nuts. Combining this experience with special high-speed machinery, Fischer supplies precision *turned* nuts at prices competitive with those produced by other methods . . . cuts normal delivery time to absolute minimum.

New economies in assembly operations are possible with Fischer nuts because each is burrless . . . tapped square with the face . . . cleaned and degreased . . . countersunk on both sides . . . tapped to Class 2 tolerances.

Specify Fischer turned brass and aluminum nuts to fill all of your requirements. An extensive line of standard nuts is offered, and "specials" are produced with speed and economy . . . many types so regularly that they have virtually become "standards" at Fischer.

Write today for new complete catalog.

1905-1955 50th ANNIVERSARY FISCHER SPECIAL MFG. CO. CINCINNATI, OHIO

Fischer SPECIAL MFG. CO.

476 MORGAN ST. • CINCINNATI 6, OHIO

C-216-FS

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; Key on page 105. Key to footnotes, page 107.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)

Detroit R7 .....$65.00
Houston S5 .....70.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 .....$64.00
Bessemer,Pa. U5 .....64.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 .....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 .....64.00
Lackawanna,N.Y. B3 ..64.00
Munhall,Pa. U5 .....64.00
Pittsburgh J5 .....64.00
So.Chicago,Ill. R2, U5..64.00
So.Duquesne,Pa. U5 ...64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$78.00
Bessemer,Pa. U5 .....78.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa. U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana,Calif. K1 ....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 .....78.00
Houston S5 .....83.00
Johnstown,Pa. B2 ....78.00
Lackawanna,N.Y. B3 ..78.00
LosAngeles B3 .....87.50
Midland,Pa. C18 .....78.00
Munhall,Pa. U5 .....78.00
Pittsburgh J5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14 ..78.00
So.Duquesne,Pa. U5 ...78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 ....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....86.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston S5 .....91.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 ....86.00
Lackawanna,N.Y. B3 ..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago, R2,U5,W14 .86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R3 .....$96.50
Canton,O. R3 .....96.50
Cleveland R3 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ...96.50

SKELP

Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 ....4.775
Munhall,Pa. U5 .....3.90
SparrowsPoint,Md. B2 ..3.90
Warren,O. R2 .....3.90
Youngstown R3, U5 ....3.90

WIRE RODS

AlabamaCity,Ala. R3 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W13 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 ....4.675
Fontana,Calif. K1 ....5.475
Houston S5 .....4.925
IndianaHarbor,Ind. Y1 .4.675
Johnstown,Pa. B2 ....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....4.925
Kokomo,Ind. C14 ....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ..4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ...5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 ....4.675
SparrowsPoint,Md. B2..4.775
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
Torrance,Calif. C11 ....5.475
Worcester,Mass. A7 ..4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Ala.City,Ala. R2 .....4.25
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 .....4.30
Ind.Harbor,Ind. I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.90
Phoenixville,Pa. P4 ....3.95
Portland,Oreg. O4 .....5.00
Seattle B3 .....5.00
So.Chicago U5, W14 ....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 ....4.25

Wide Flange

Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 .....5.25
Lackawanna,N.Y. B2 ...4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....3.95
So.Chicago,Ill. U5 .....4.25

Alloy Stand. Shapes

Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston S5 .....5.45
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Houston S5 .....6.45
Ind.Harbor,Ind. I-2, Y1.6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 ....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14..6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES

Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ...5.075
Lackawanna,N.Y. B2 ...5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 ....5.075

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.225
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Buffalo R2 .....4.225
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Cleveland J5, R2 .....4.225
Coatesville,Pa. L7 ....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich. G5 .....4.325
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 ....3.975
Houston S5 .....4.275
Ind.Harbor,Ind. I-2, Y1.4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2 ...4.225
Lonestar,Tex. L6 .....4.55
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ....5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. R2 .....4.225
So.Chicago,Ill. U5,W14..4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ...4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 .....4.225
Youngstown R2,U5,Y1..4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron

Economy,Pa. B14 .....9.80

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Conshohocken,Pa. A3 ..6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1 ..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.46
Houston S5 .....6.50
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14..6.45
SparrowsPoint,Md. B2..6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy

Claymont,Del. C22 ....5.80
Coatesville,Pa. L7 ....5.80
Fontana,Calif. K1 .....6.46
Gary,Ind. U5 .....5.80
Houston S5 .....5.85
Ind.Harbor,Ind. Y1 ....5.80
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14..5.80
SparrowsPoint,Md. B2..5.80
Youngstown Y1 .....5.80

FLOOR PLATES

Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ....5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 ....5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 .....4.825
Warren,O. c.l. R2 ....4.825

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.30
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.80
Atlanta,Ga. A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.40
Clairton,Pa. U5 .....4.30
Cleveland R2 .....4.30
Ecorse,Mich. G5 .....4.40
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.55
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Massillon,O. R2 .....4.40
Midland,Pa. C18 .....4.30
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.30
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23....5.05
So.Chicago, R2,U5,W14..4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 .5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.30
Weirton,W.Va. W6 .....4.30
Youngstown R2, U5 ....4.30

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.075
Buffalo R2 .....5.075
Canton,O. R2, T7 .....5.075
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.075
Ecorse,Mich. G5 .....5.175
Fontana,Calif. K1 .....6.126
FairlessHills,Pa. U5 ...5.225
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1.5.075
Johnstown,Pa. B2 .....5.075
KansasCity,Mo. S5 ....5.225
Lackawanna,N.Y. B2 ...5.075
LosAngeles B3 .....6.126
Massillon,O. R2 .....5.075
Midland,Pa. C18 .....5.075
So.Chicago R2, U5, W14 5.075
So.Duquesne,Pa. U5 ...5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 .....5.825

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston S5 .....6.70
Ind.Harb.,Ind. I-2, Y1..6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 ....6.70
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ....6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O. R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES, H.R. Carbon

Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES, S. Shapes

Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston S5 .....5.45
KansasCity S5 .....5.45
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....5.40
BeaverFalls,Pa. M12, R2 5.40
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 .....5.40
Detroit R7 .....5.40
Detroit B5, P17 .....5.00
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ...5.40
Gary,Ind. R2 .....5.40
GreenBay,Wis. P7 .....5.40
Hammond,Ind. L2, M13..5.40
Hartford,Conn. R2 .....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2, S30 ....6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R2, R8 ...5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 .....5.65
Putnam,Conn. W18 .....5.95
Readville,Mass. C14 ....5.95
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...5.85
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12,R2 6.625
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 .....6.625
Detroit R7 .....6.625
Detroit B5, P17 .....6.625
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.625
GreenBay,Wis. P7 .....6.625
Hammond,Ind. L2, M13 6.625
Hartford,Conn. R3 .....6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2 ...6.625
LosAngeles S30 .....8.30
Mansfield,Mass. B5 ....6.925
Massillon,O. R2, R8 ...6.625
Midland,Pa. C18 .....6.625
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 .....6.625
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ...6.925
Youngstown F3, Y1 ....6.625

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....7.525
Camden,N.J. P13 .....7.70
Carnegie,Pa. C12 .....7.525
Chicago W18 .....7.525
Cleveland C20 .....7.525
Monaca,Pa. S17 .....7.525
Newark,N.J. W18 .....7.70
SpringCity,Pa. K3 .....7.70
Warren,O. C17 .....7.525

BARS, Reinforcing (To fabricators)

Ala.City,Ala. R2 .....4.20
Atlanta A11 .....4.50
Birmingham C15 .....4.20
Buffalo R2 .....4.20
Cleveland R2 .....4.20
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.20
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gary,Ind. U5 .....4.20
Houston S5 .....4.55

Ind.Harbor,Ind. I-2, Y1 4.30
Johnstown,Pa. B2 ..... 4.30
KansasCity,Mo. S5 ..... 4.55
Lackawanna,N.Y. B2 ... 4.30
LosAngeles B3 ..... 5.00
Milton,Pa. M18 ..... 4.30
Minnequa,Colo. C10 .... 4.75
Niles,Calif. Y1 ..... 5.00
Pittsburg,Calif. C11 .... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
SandSprings,Okla. S5 ... 4.80
Seattle B3, N14 P23 .... 5.05
So.Chicago R2 ..... 4.30
So.Duquesne,Pa. U5 .... 4.30
So.SanFrancisco B3 .... 5.05
SparrowsPoint,Md. B2 .. 4.30
Sterling,Ill.(1) N15 .... 4.30
Sterling,Ill. N15 ..... 4.40
Struthers,O. Y1 ..... 4.30
Torrance,Calif. C11 .... 5.00
Youngstown R3, U5 .... 4.30

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2.. 5.70
KansasCity S5 ..... 6.50
LosAngeles B3 ..... 5.95
Marion,O. P11 ..... 6.55
Pittsburgh J5, U8 ..... 5.72
Seattle B3, N14, P23 ... 6.15
So.SanFrancisco B3 .... 6.00
SparrowsPt. ¼-1" B2.. 5.70
Williamsport,Pa. S19 ... 5.60

RAIL STEEL BARS

Avis,Pa.(3) J8 ..... 4.25
ChicagoHts.(3) C2, I-2.. 4.20
ChicagoHts.(4) C2, I-2.. 4.30
Ft.Worth,Tex.(28) T4 .. 4.75
Franklin,Pa.(3) F5 .... 4.20
Franklin,Pa.(4) F5 .... 4.30
Marion,O.(3) P11 ..... 4.15
Moline,Ill.(3) R2 ..... 4.30
Tonawanda(3) B12 .... 4.15
Tonawanda(4) B12 .... 4.30
Williamsport,Pa.(3) S19 4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks(S.R.) L5 .... 10.85
McK.Rks.(D.R.) L5 ... 14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.05
Allenport,Pa. P7 ..... 4.05
Ashland,Ky.(8) A10 .... 4.05
Cleveland J5, R2 ..... 4.05
Conshohocken,Pa. A3 ... 4.10
Detroit(8) M1 ..... 4.15
Ecorse,Mich. G5 ..... 4.15
Fairfield,Ala. T2 ..... 4.05
FairlessHills,Pa. U5 .... 4.10
Fontana,Calif. K1 ..... 4.825
Gary,Ind. U5 ..... 4.05
Geneva,Utah C11 ..... 4.15
GraniteCity,Ill. G4 ..... 4.25
Houston S6 ..... 4.30
Ind.Harbor,Ind. I-2, Y1 4.05
Irvin,Pa. U5 ..... 4.05
Kokomo,Ind. C16 ..... 4.15
Lackawanna,N.Y. B2 ... 4.05
Mansfield,O. E6 (37) ... 4.05
Mansfield,O. E6(38) 4.80
Munhall,Pa. U5 ..... 4.05
Newport,Ky. N9 ..... 4.05
Niles,O. N12 ..... 4.05
Pittsburg,Calif. C11 .... 4.75
Pittsburgh J5 ..... 4.05
Portsmouth,O. P12 ..... 4.05
Riverdale,Ill. A1 ..... 4.05
Sharon,Pa. S3 ..... 4.05
So.Chicago,Ill. W14 .... 4.05
SparrowsPoint,Md. B2 .. 4.05
Steubenville,O. W10 .... 4.05
Warren,O. R2 ..... 4.05
Weirton,W.Va. W6 ..... 4.05
Youngstown U5, Y1 .... 4.05

SHEETS, H.R. (19 ga. lighter)

Ala.City,Ala. R2 ..... 5.35
Kokomo,Ind. C16 ..... 5.20
Niles,O. N12 ..... 4.95

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ..... 5.80
Youngstown Y1 ..... 5.80

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.10
Conshohocken,Pa. A3 ... 6.15
Ecorse,Mich. G5 ..... 6.20
Fairfield, Ala. T2 ..... 6.10
FairlessHills,Pa. U5 .... 6.15
Fontana,Calif. K1 ..... 6.875
Gary,Ind. U5 ..... 6.10
Ind.Harbor,Ind. I-2, Y1 6.10
Irvin,Pa. U5 ..... 6.10
Lackawanna(35) B2 .... 6.10
Munhall,Pa. U5 ..... 6.10
Pittsburgh J5 ..... 6.10
Sharon,Pa. S3 ..... 6.10
So.Chicago,Ill. U5 ..... 6.10
SparrowsPoint(36) B2 .. 6.10
Warren,O. R2 ..... 6.10
Weirton,W.Va. W6 ..... 6.10
Youngstown U5, Y1 .... 6.10

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 .... 4.30
Cleveland R2 ..... 4.65
Ind.Harbor,Ind. I-2 .... 4.30
Warren,O. R2 ..... 4.65

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 4.95
Cleveland J5, R2 ..... 4.95
Conshohocken,Pa. A3 ... 5.00
Ecorse,Mich. G5 ..... 5.05
Fairfield,Ala. T2 ..... 4.95
FairlessHills,Pa. U5 .... 5.00
Follansbee,W.Va. F4 ... 4.95
Fontana,Calif. K1 ..... 6.05
Gary,Ind. U5 ..... 4.95
GraniteCity,Ill. G4 ..... 5.15
Ind.Harbor,Ind. I-2, Y1 4.95
Irvin,Pa. U5 ..... 4.95
Lackawanna,N.Y. B2 ... 4.95
Middletown,O. A10 ..... 4.95
Pittsburg,Calif. C11 .... 5.90
Pittsburgh J5 ..... 4.95
Portsmouth,O. P12 ..... 4.95
SparrowsPoint,Md. B2 .. 4.95
Warren,O. R2 ..... 4.95
Weirton,W.Va. W6 ..... 4.95
Youngstown Y1 ..... 4.95

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.50
Ecorse,Mich. G5 ..... 7.60
FairlessHills,Pa. U5 .... 7.55
Fontana,Calif. K1 ..... 8.56
Gary,Ind. U5 ..... 7.50
IndianaHarbor,Ind. Y1 .. 7.50
Irvin,Pa. U5 ..... 7.50
Lackawanna(37) B2 .... 7.50
Pittsburgh J5 ..... 7.50
SparrowsPoint(38) B2 .. 7.50
Warren,O. R2 ..... 7.50
Weirton,W.Va. W6 ..... 7.50
Youngstown Y1 ..... 7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ..... 5.55
Middletown,O. A10 ..... 5.45
Warren,O. R2 ..... 5.55

SHEETS, Culvert (16 Ga.)

	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.50	....
Canton,O. R2	6.50	7.10
Fairfield T2	5.70	....
Gary,Ind. U5	5.70	5.95
Ind.Harbor I-2	5.70	5.95
Irvin,Pa. U5	5.70	....
Kokomo,Ind. C16	5.80	....
MartinsFry.,O. W10	5.70	....
Newport,Ky. N9	5.70	5.95
Pitts.,Calif. C11	6.45	....
SparrowsPt. B2	5.70	....

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ..... 6.75
Gary,Ind. U5 ..... 5.95
MartinsFerry,O. W10 ... 5.95

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ..... 5.45‡
Ashland,Ky. A10 ..... 5.45*
Butler,Pa. A10 ..... 5.45†
Canton,O. R2 ..... 5.45‡
Delphos,O. N16 ..... 6.10‡
Dover,O. R1 ..... 5.45‡
Fairfield,Ala. T2 ..... 5.45†
Gary,Ind. U5 ..... 5.45*
GraniteCity,Ill. G4 .... 5.65‡
Ind.Harbor,Ind. I-2 .... 5.45†
Irvin,Pa. U5 ..... 5.45†
Kokomo,Ind. C16 ..... 5.50‡
MartinsFerry,O. W10 .. 5.45*
Middletown,O. A10 .... 5.45†
Newport,Ky. N9 ..... 5.45†
Niles,O. N12 ..... 5.45‡
Pittsburg,Calif. C11 ... 6.20*
SparrowsPt.,Md. B2 .... 5.45‡
Weirton,W.Va. W6 .... 5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ..... 6.325

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 ..... 8.20
SparrowsPoint(39) B2 .. 8.20

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 5.85
Irvin,Pa. U5 ..... 5.85
Kokomo,Ind. C16 ..... 5.95
Newport,Ky. N9 ..... 5.85
Niles,O. N12 ..... 5.85

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 .... 5.70
Canton,O. R2 ..... 6.20

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ..... 5.70
Butler,Pa. A10 ..... 5.70
Middletown,O. A10 ..... 5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.20
Niles,O.(28) R2 ..... 6.30
Weirton,W.Va. W6 ..... 6.15

SHEETS, Aluminum Coated

Butler,Pa. A10 ..... 8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 .... 5.375
Cleveland R2 ..... 5.375
Gary,Ind. U5 ..... 5.375
GraniteCity,Ill. G4 .... 5.575
Ind.Harbor,Ind. I-2 .... 5.375
Irvin,Pa. U5 ..... 5.375
Middletown,O. A10 .... 5.375
Niles,O. N12 ..... 5.375
Youngstown Y1 ..... 5.375

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 .. 7.375
Follansbee(23) F4 ..... 6.60
Yorkville,O. W10 ..... 7.375

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 ..... 5.85
Mansfield,O. E6 ..... 5.85
Middletown,O. A10 ..... 5.85
Niles,O. N12 ..... 5.85
Weirton,W.Va. W6 ..... 5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O., A10 ..... 6.35

Key to Producers

A1 Acme Steel Co.
A2 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.High Carb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.05
Allenport,Pa. P7	4.05
Alton,Ill. L1	4.225
Ashland,Ky.(8) A10	4.05
Atlanta A11	4.25
Bessemer,Ala. T3	4.05
Birmingham C15	4.05
Buffalo(27) R2	4.05
Conshohocken,Pa. A3	4.10
Detroit M1	4.15
Ecorse,Mich. G5	4.15
Fairfield,Ala. T2	4.05
Fontana,Calif. K1	4.825
Gary,Ind. U5	4.05
Houston,Tex.(9) S5	4.30
Ind.Harbor,Ind. I-2, Y1	4.05
Johnstown,Pa.(25) B2	4.05
KansasCity,Mo.(9) S5	4.30
Lackaw'na,N.Y.(25) B2	4.05
LosAngeles(25) B3	4.80
Milton,Pa. M16	4.05
Minnequa,Colo. C10	5.15
N.Tonawanda,N.Y. B11	4.05
Pittsburg,Calif. C11	4.80
Portsmouth,O. P12	4.05
Riverdale,Ill. A1	4.05
SanFrancisco S7	5.00
Seattle(25) B3, P23	5.05
Seattle N14	5.05
Sharon,Pa. S3	4.05
So.Chicago,Ill. W14	4.05
So.SanFrancisco(25) B3	4.80
SparrowsPoint,Md. B2	4.05
Sterling(1) N15	4.05
Sterling,Ill. N15	4.15
Torrance,Calif. C11	4.80
Warren,O. R2	4.05
Weirton,W.Va. W6	4.05
Youngstown U5	4.05

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	6.70
Fontana,Calif. K1	8.10
Gary,Ind. U5	6.70
Houston,Tex. S5	6.95
Ind.Harbor,Ind. Y1	6.70
KansasCity,Mo. S5	6.95
LosAngeles B3	7.90
Newport,Ky. N9	6.70
Seattle P23	7.80
Sharon,Pa. S3	6.70
So.Chicago W14	6.70
Youngstown U5, Y1	6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.15
Conshohocken,Pa. A3	6.15
Ecorse,Mich. G5	6.25
Fairfield,Ala. T2	6.15
Fontana,Calif. K1	7.25
Gary,Ind. U5	6.15
Houston S5	6.55
Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.75
Lackawanna,N.Y. B2	6.15
LosAngeles(25) B3	6.90
Seattle(25) B3, P23	7.15
Sharon,Pa. S3	6.15
So.SanFrancisco(25) B3	6.90
SparrowsPoint,Md. B2	6.15
Warren,O. R2	6.15
Weirton,W.Va. W6	6.15
Youngstown U5, Y1	6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.30
Warren,O. R2	4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	5.75
Baltimore T6	5.75
Cleveland A7, J5	5.75
Conshohocken,Pa. A3	5.80
Dearborn,Mich. D3	5.85
Detroit P39	5.90
Detroit D2, M1	5.85
Dover,O. G6	5.75
Ecorse,Mich. G5	5.85
Follansbee,W.Va. F4	5.75
Fontana,Calif. K1	7.65
FranklinPark,Ill. T6	5.85
Ind.Harbor,Ind. I-2	5.85
Ind.Harbor,Ind. Y1	5.75
Indianapolis C8	5.90
Lackawanna,N.Y. B2	5.75
LosAngeles C1	7.80
Mattapan,Mass. T6	6.30
Middletown,O. A10	5.75
NewBedford,Mass. R10	6.20
NewBritain(10) S15	5.75
NewCastle,Pa. B4, E5	5.75
NewHaven,Conn. A7	6.50
NewHaven,Conn. D2	6.30
Pawtucket,R.I. R3	6.40
Pawtucket,R.I. N8	6.30
Pittsburgh J5	5.75
Portsmouth,O. P12	5.75
Riverdale,Ill. A1	5.85
Rome,N.Y.(32) R6	5.75
Sharon,Pa. S3	5.75
SparrowsPt.,Md. B2	5.75
Trenton,N.J.(31) R5	7.30
Wallingford,Conn. W2	6.20
Warren,O. B9, R2, T5	5.75
Weirton,W.Va. W6	5.75
Worcester,Mass. A7	6.60
Youngstown C8, Y1	5.75

STRIP, Cold-Rolled Alloy

Carnegie,Pa. S18	12.45
Cleveland A7	12.45
Dover,O. G6	12.45
Fontana,Calif. K1	14.55
FranklinPark,Ill. T6	12.45
Harrison,N.J. C18	12.45
Mattapan,Mass. T6	12.80
Pawtucket,R.I. N8	12.80
Sharon,Pa. S3	12.45
Worcester,Mass. A7	12.75
Youngstown C8	12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5	8.60
Dearborn,Mich. D3	8.70
Dover,O. G6	8.60
Ecorse,Mich. G5	8.70
Ind.Harbor,Ind. Y1	8.60
Lackawanna,N.Y. B2	8.425

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.25	9.30	11.45	14.15
Bristol,Conn. W1	...	...	9.30	11.45	...
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.85	8.25	9.20	...	...
Detroit D2	5.85	8.25	9.20	10.95	...
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
Mattapan,Mass. T6	6.30	8.35	9.30	11.45	14.15
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	...
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.35	...
New York W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill. A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	12.90	15.60	...
Buffalo W12	...	...	12.90	...	...
FranklinPark,Ill. T6	...	...	13.40	16.10	19.50
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. A7, T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	...	...
Youngstown C8	...	...	13.25	15.95	19.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric Motor		Dynamo
BeechBottom,W.Va. W10	...	...	9.10	10.10	11.00
Brackenridge,Pa. A4	...	...	9.10	10.10	11.00
Mansfield,O. E8	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	...
Vandergrift,Pa. U5	...	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	...	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric Motor		Dynamo
Brackenridge,Pa. A4	...	...	9.95	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	...
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	...	...
Vandergrift,Pa. U5	...	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.325*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.325†	9.25	9.85	10.85	11.75
Zanesville,O. A10	...	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	...	...	...
Newport,Ky. N9	11.95	...	...	...
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95†	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	...	15.00	16.60	17.10	...
Butler,Pa. A10	...	...	16.60	17.10	...
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	...	...	...	...	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. ‖ Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Irvin,Pa. U5	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	...	...
Niles,O. R2	6.175	6.375	6.575

TINPLATE,American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Irvin,Pa. U5	8.80	9.05
Pitts.,Cal. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Fairfield,Ala. T2	6.70
FairlessHills,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Irvin,Pa. U5	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60

Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	6.20
Gary,Ind. U5	6.20
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.20
Irvin,Pa. U5	6.20
Yorkville,O. W10	6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.75
Aliquippa,Pa. J5	5.75
Alton,Ill. L1	5.925
Atlanta A11	5.95
Bartonville,Ill. K4	5.85
Buffalo W12	5.75
Chicago W13	5.75
Cleveland A7, C20	5.75
Crawfordsville,Ind. M8	5.85
Donora,Pa. A7	5.75
Duluth,Minn. A7	5.75
Fairfield,Ala. T2	5.75
Fostoria,O.(24) S1	5.95
Houston S5	6.00
Jacksonville,Fla. M8	6.27
Johnstown,Pa. B2	5.75
Joliet,Ill. A7	5.75
KansasCity,Mo. S5	6.00
Kokomo,Ind. C16	5.85
LosAngeles B3	6.70
Minnequa,Colo. C10	6.00
Monessen,Pa. P7	5.75
Newark 6-8 ga. I-1	6.40
No.Tonawanda B11	5.75
Palmer,Mass. W12	6.05
Pittsburg,Calif. C11	6.70
Portsmouth,O. P12	5.75
Rankin,Pa. A7	5.75
So.Chicago,Ill. R2	5.75
So.SanFrancisco C16	6.70
SparrowsPoint,Md. B2	5.85
Sterling,Ill.(1) N15	5.75
Sterling,Ill. N15	5.85
Struthers,O. Y1	5.75
Waukegan,Ill. A7	5.75
Worcester,Mass. A7	6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.375
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Cleveland A7	7.20
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fostoria,O. S1	7.20
Johnstown,Pa. B2	7.20
LosAngeles B3	8.15
Milbury,Mass.(12) N8	7.50
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
Muncie,Ind. I-7	7.40
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Roebling,N.J. R5	7.50
So.Chicago,Ill. R2	7.20
So.SanFrancisco C10	8.15
SparrowsPt.,Md. B2	7.30
Struthers,O. Y1	7.20
Trenton,N.J. A7	7.50
Waukegan,Ill. A7	7.20
Worcester A7,J4,T6,W12	7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.90
Alton,Ill. L1	7.075
Buffalo W12	6.90
Cleveland A7	6.90
Donora,Pa. A7	6.90
Duluth,Minn. A7	6.90
Johnstown,Pa. B2	6.90
KansasCity,Mo. S5	7.50
LosAngeles B3	7.85
Minnequa,Colo. C10	7.075
Monessen,Pa. P7, P16	6.90
NewHaven,Conn. A7	7.20
Palmer,Mass. W12	7.20
Pittsburg,Calif. C11	7.85
Portsmouth,O. P12	6.90
Roebling,N.J. R5	7.20
So.Chicago,Ill. R2	6.90
So.SanFrancisco C10	7.85
SparrowsPoint,Md. B2	7.00
Struthers,O. Y1	6.90
Trenton,N.J. A7	7.20
Waukegan,Ill. A7	6.90
Worcester,Mass. A7	7.20

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	11.375
Bartonville,Ill. K4	11.30
Buffalo W12	11.20
Chicago W13	11.20
Cleveland A7	11.20
Crawfordsville,Ind. M8	11.30
Fostoria,O. S1	11.20
Jacksonville,Fla. M8	11.73
Johnstown,Pa. B2	11.20
Kokomo,Ind. C16	11.20
Minnequa,Colo. C10	10.95
Monessen,Pa. P16	11.20
Muncie,Ind. I-7	11.40
Palmer,Mass. W12	11.50
Roebling,N.J. R5	11.50
So.SanFrancisco C10	11.55
Waukegan,Ill. A7	11.20
Worcester,Mass. A7,T6	11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	9.90
Buffalo W12	9.90
Johnstown,Pa. B2	9.90
Minnequa,Colo. C10	10.025
Monessen,Pa. P16	9.90
Muncie,Ind. I-7	10.10
Portsmouth,O. P12	9.90
Roebling,N.J. R5	10.20
SparrowsPt.,Md. B2	10.00

ROPE WIRE (A)

Alton,Ill. L1	9.75
Bartonville,Ill. K4	9.75
Buffalo W12	9.75
Fostoria,O. S1	9.75
Johnstown,Pa. B2	9.75
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
SparrowsPt. B2	9.85
Struthers,O. Y1	9.75
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Alton,Ill. L1	13.25
Bartonville,Ill. K4	13.25
Monessen,Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling,N.J. R5	13.45

WIRE, Cold-Rolled Flat

Andersen,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. M8	8.05
Dover,O. G6	7.95
Fostoria, O. S1	7.95
FranklinPark,Ill. T6	8.05
Kokomo,Ind. C16	8.05
Massillon,O. R8	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Pawtucket,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

	(6 to 8 gage)	An'ld Galv.
Ala.City,Ala.	R2	6.90 7.30**
Aliquippa J5		6.90 7.42½†
Atlanta A11		7.00 7.55
Bartonville(48)	K4	7.00 7.55
Buffalo W12		6.90 7.30†
Cleveland A7		6.90 ....
Crawfordsville M8		7.00 7.55
Donora,Pa. A7		6.90 7.30†
Duluth,Minn. A7		6.90 7.30†
Fairfield T2		6.90 7.30†
Houston,Tex. S5		7.15 7.55†
Jacks'ville,Fla. M8		7.425 7.95
JohnstownB2(48)		6.90 7.45*
Joliet,Ill. A7		6.90 7.30†
KansasCity,Mo. S5		7.15 7.65†
Kokomo C16		7.00 7.40†
LosAngeles B3		7.85 ....
Minnequa C10		7.15 7.55**
Monessen P7 (48)		6.90 7.45
Palmer W12		7.20 7.60†
Pitts.,Calif. C11		7.85 8.25†
Portsmouth,O. P12		6.90 ....
Rankin A7		6.90 7.30†
So.Chicago R2		6.90 7.30**
S.S.Fran. C10		7.85 8.25**
SparrowsPt.B2(48)		7.00 7.55*
Sterling(1)(48)N15		6.90 7.45
Struthers,O.(48)Y1		6.90 7.40†
Worcester A7		7.20 ....

*Based on 11c zinc; †5c zinc; ‡ Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.

Ala.City,Ala. R3	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga.J5	149‡
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	151†
Johnstown,Pa.(43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	151†
Kokomo,Ind. C16	148†
Minnequa,Colo. C10	154**
Monessen,Pa. 9 ga. P17	149
Pittsburg,Calif. C11	160†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

†Based on 6c zinc; *11c zinc; ‡ 10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	157
Donora,Pa. A7	155
Duluth,Minn. A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	156
Houston S5	160
KansasCity,Mo. S5	160
Kokomo,Ind. C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed Col.

AlabamaCity,Ala. R2	196**
Aliquippa J5	156‡
Atlanta A11	164
Bartonville,Ill. K4	164
Crawfordsville,Ind. M8	164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	164†
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	164†
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	165**
Monessen,Pa. P7	162
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill.(1) N15	162

†Based on 5c zinc; * 11c zinc; ‡10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)	An'ld Galv. Stone Stone
Ala.City R2	13.15 14.70**
Bartonville K4	13.25 15.10
Buffalo W12	13.15 ....
Cleveland A7	13.15 ....
Crawfordsville M8	13.25 15.10
Fostoria,O. S1	13.25 14.80†
Johnstown B2	13.15 15.00*
Kokomo C16	13.25 14.80†
Minnequa C10	13.40 15.10**
Palmer,Mas.W12	13.15 14.70†
Pitts.,Calif. C11	13.50 15.05†
So.Chicago R2	13.15 14.70
SparrowsPt. B2	13.25 15.10*
Sterling(1) N15	13.15 15.00
Waukegan A7	13.15 14.70†
Worcester A7	13.45 ....

* Based on 11c zinc; † 5c zinc; ‡ 10c zinc; ** Subject to zinc equalization extras.

NAILS, Stock
To dealers & mfrs. (7) Col.

AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston,Tex. S5	142
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	142
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)
To dealers (33)

Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	8.30

STAPLES, Polished Stock
To dealers & mfrs. (7) Col.

Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	139
Crawfordsville,Ind. M8	139
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	139
Minnequa,Colo. C10	143
Monessen,Pa. P7	137
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
SparrowsPt.,Md. B2	140
Sterling,Ill. (1) N15	137
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	150
Duluth,Minn. A7	150
Franklin,Pa. F5	150
Johnstown,Pa. B2	150
Marion,O. P11	150
Minnequa,Colo. C10	155
Moline,Ill. R2	155
So.Chicago,Ill. R2	150
Tonawanda,N.Y. B12	150
Williamsport,Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

4 in. and shorter:	
½-in. & smaller diam	2
Over 4 in. through 6 in.:	
½ in. & smaller diam	+3
6 in. and shorter:	
⅝-in. and ⅞-in.	+6
1 in. and larger	+6
Longer than 6 in.:	
All diameters	+15
Lag bolts, all diams.:	
6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoes	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	55
H.P., Hex, regular & heavy:	
⅝" and smaller	56
¾" to 1¼" inclusive	58
1⅜" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy:	
All sizes	55
Hot Galv. Nuts (all types):	
⅝" or smaller	38
¾" to 1½", inclusive	41
Finished Hex Nuts:	
New standard, all sizes	55
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	43
Plated finishes	23

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼ in. through ⅝-in.	38
⅝-in. through 1 in.	15
Longer than 6 in.:	
¼-in. through ⅝-in.	20
⅝-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
⅞-in. under...List less 37½

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1⅝	13	25.28	30.31	24.52
1¾	13	28.33	33.97	27.48
2	13	31.91	38.26	30.95
2¼	13	34.63	41.52	33.59
2½	12	38.15	45.74	37.00
2⅝	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All No. 2	Too Rolls 60 lb Under
RAILS				
Bessemer,Pa. U5	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	...	5.35
Fairfield,Ala. T2	...	...	...	5.35
Gary,Ind. U5	4.45	4.35	4.40	...
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	...
Johnstown,Pa. B2	...	...	...	(16)5.35
Lackawanna,N.Y. B2	4.45	4.35	...	5.35
Minnequa,Colo. C10	4.45	4.35	...	5.85
Steelton,Pa. B2	4.45	4.35	...	5.35
Williamsport,Pa. S19	...	...	...	5.35

TIE PLATES

Fairfield,Ala. T2	5.275
Gary,Ind. U5	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (30) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa,Colo. C10	11.50
Pittsburgh O3, P14	11.50
Seattle B3	12.00

AXLES

Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS

Bessemer,Pa. U5	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2	5.425
Joliet,Ill. U5	5.425
Lackawanna,N.Y. B2	5.425
Minnequa,Colo. C10	5.425
Steelton,Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.l.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	23.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns—83.00-148.00	
Aluminum:	
Atomized, 500 lb drums, frgt. allowed:	
Cariots	30.00
Ton lots	32.00
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	29.75-37.25†
Bronze, 5000-lb lots	48.75-52.00†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	45.50‡
Nickel-Silver, 5000-lb lots	49.00**
Phosphor-Bronze, ½-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	91.00
Tin	13.50*
Zinc, 5000-lb lots	17.25-31.00‡
Tungsten	Dollars
Melting grade, 99% 65 to 200 mesh:	
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.2% Cr min.	3.60

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 29% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼" to 2 7/16"; 1 7/16" to 1 15/16" 4.75c; 1 15/16" to 2 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 2 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.969 in.; for gage 0.142 and lighter, 5.85c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.35c H.S.-I.A.
(31) Widths over ⅝-in.; 6.40c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 12" and narrower.
(36) 54" and narrower.
(37) 13 gage & heavier; 60" & narrower, in. and thinner.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.075" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(43) 9-14½ gage.
(48) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
List Per Ft	27c	36.5c	76.5c	92c	$1.09	$1.48	$1.92						
Pounds Per Ft	3.66	5.82	7.62	9.20	10.89	14.81	19.18						

	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	13.5	+3	17.5	+0.25	20	2.25	31.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	13.5	...	17.5	...	20	...	31.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3	13.5	+3	17.5	+0.25	20	2.25	31.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	13.5	+3	17.5	+0.25	20	2.25	31.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Youngstown R2	13.5	+3	17.5	+0.25	20	2.25	31.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	⅛	¼	⅜	½	¾	1	1¼
List Per Ft	5.5c	6c	8c	8.5c	11.5c	17c	23c
Pounds Per Ft	0.24	0.42	0.57	0.85	1.13	1.68	2.28

	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10..	24	+4.5	15.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. F6	25	+3.5	17	+ 8.5	9.5	+15	....	..	....	...	....	..	....	....
Etna, Pa. N2	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless, Pa. N3	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+ 8.5	9.5	+15	....	..	....	...	....	..	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B3	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1½	2	2½	3	3½	4
List Per Ft	27.5c	37c	58.5c	76.5c	92c	$1.09
Pounds Per Ft	2.73	3.65	5.82	7.62	9.20	10.89

	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	....	...	....	...
Benwood, W. Va. W10...	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N2	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sharon, Pa. M6	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sparrows Pt., Md. B3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.75	21.00	30.00	34.75	30.25	35.75	37.75	41.75	38.75
302	17.75	23.25	30.25	35.00	32.50	36.00	38.00	42.00	42.00
302B	19.00	25.00	31.00	35.00	35.50	36.00	38.00	45.25	45.25
303	....	25.25	32.75	37.75	....	38.75	40.25	46.00	46.00
304	19.00	24.50	31.75	36.75	35.00	38.00	40.50	44.50	44.50
304L	....	....	36.75	41.75	40.00	43.00	45.50	49.50	49.50
305	20.50	26.50	33.50	37.25	38.00	38.00	41.00	47.50	47.50
308	20.75	27.25	36.25	41.75	39.00	43.00	47.00	49.00	49.00
309	27.75	36.00	44.00	50.50	50.50	51.75	55.00	63.25	63.25
309S	29.75	38.75	48.00	55.75	55.25	56.75	60.25	69.75	69.75
310	35.00	45.25	56.75	66.25	64.75	69.50	71.00	74.25	74.25
314	....	....	....	....	....	....	71.00	....	....
316	29.75	38.00	48.25	56.25	50.00	57.25	60.50	64.50	64.50
316L	....	....	53.25	61.25	60.00	62.25	65.50	69.50	69.50
317	35.00	45.50	59.25	68.75	69.50	70.25	72.75	79.00	79.00
321	23.50	30.25	36.00	41.50	41.75	42.75	46.50	51.25	51.25
330	....	....	61.50	....	....	72.00	73.25	81.25	81.25
18-8CbTa	30.25	38.25	46.00	52.25	53.00	53.75	58.50	66.50	66.50
403	....	....	27.00	30.75	....	32.00	34.25	....	....
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.25	26.25	28.75	30.00	34.25	34.25
414	....	....	....	34.50	....	....	29.25	30.50	35.25	35.25
416	....	....	....	24.50	25.25	....	29.25	....	....	....
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	....	....	25.00	26.75	....	29.75	....	....	....
431	15.00	19.25	25.00	28.75	28.00	29.75	....	35.75	35.75
446	....	....	....	33.50	34.25	50.25	39.50	40.75	59.75	59.75

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	....	28.00
304	27.60–28.30	32.70–33.60	29.75
304-L	30.30	35.50	....
316	32.60–33.40	37.70–38.80	42.75
316-L	37.80	43.30	....
316-CB	38.90	45.50	....
321	29.30–30.00	34.40–35.30	34.25
347	30.40–32.20	38.60	44.25
405	23.40–23.90	30.60–31.10	....
410	22.90–23.40	30.10–30.60	....
430	23.40	30.60	24.25
Inconel	47.90	63.90	....
Nickel	39.50	54.10	....
Monel	40.80	54.80	....
L-Nickel	41.70	58.50	....
Copper*	....	....	46.00

	Strip, Carbon Base: Cold-Rolled 10%	Strip, Carbon Base: Cold-Rolled Both Sides	Strip, Carbon Base: Hot-Rolled 10%	Strip, Carbon Base: Hot-Rolled Both Sides
Copper*	28.85	35.85	25.00	32.25

* Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	...	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.900

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala. R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Gadsden,Ala. R2	52.38	52.88	....	....
Cincinnati, deld.	....	60.58	....	....
Buffalo District				
Buffalo H1, R2	56.00	56.00	57.00	57.50
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	57.50
Boston, deld.	66.85	67.15	67.65	....
Rochester, N.Y., deld.	59.02	59.52	60.02	....
Syracuse,N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
MuskegonMich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7, R2	56.00	56.50	56.50	57.00
Akron,O., deld.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	55.00	55.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	55.00	55.50	....	....
Chester,Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton,Pa. B2	55.00	55.50	59.00	59.50
Swedeland,Pa. A3	55.00	55.50	59.00	59.50
Philadelphia, deld.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	55.00	55.50	59.00	59.50
Pittsburgh District				
Nevillelsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKeesRocks, deld.	....	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	58.16	58.16	58.66
Verona,Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown Lo	56.00	....	....	57.00
Mansfield,O. deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.50	61.00	61.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar, Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	52.50*	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.00 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$65.00
Buffalo H1	64.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $3 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$80.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	85.00
Keokuk, OH & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	84.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Lyle,Tenn. T3	70.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, deld.	67.56
Troy,N.Y. R2	64.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Buffalo, 25 cents on C.R. and galvanized sheets, C.F. and alloy bars and 20 cents on other commodities; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302‡§	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.¶	H.R. Alloy 4140††‡		Carbon	Floor
Baltimore	6.02	7.51	7.79	....	6.69	...	6.68	8.52*	12.04	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25†	....	6.60	...	6.50	9.10	....	6.6o	6.65	6.45
Boston	7.23	8.23	9.52	45.25**	7.47	...	7.20	8.60	13.45	7.49	7.27	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.15	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.35	7.38	8.30	46.05	6.62	...	6.51	7.50	11.90	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	46.10	6.86	...	6.75	7.80	12.30	6.86	6.81	7.89
Cleveland	6.35	7.35	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.35	6.79	7.79	12.10	7.16	6.80	7.83
Erie, Pa.	6.35	7.35	8.30	....	6.70	...	6.50	7.45*	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.60	7.35	8.75
Los Angeles	7.50	9.35	9.95	60.15	7.85	11.75	7.45	10.15	13.20	7.65	7.45	9.55
Milwaukee	6.47	7.47	8.39	...	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	7.04	6.87	...
New York	6.97	7.91	8.79	44.95	7.56	...	7.37	8.73*	12.28	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98*	6.96	8.80	6.74	8.36*	12.36	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	46.00	6.72	...	6.51	7.85	11.90	6.6r	6.52	7.64
Portland, Oreg.	7.60	9.75	9.35	48.50	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.85	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	...	7.28	...	7.17	8.26	....	7.35	7.18	8.20
San Francisco	7.55	8.95	8.70	51.65	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	51.00	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.35	9.65†	10.05	....	7.80	...	7.80	10.85‡‡	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.99	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11-cent zinc except in New York, Philadelphia, Los Angeles, Cincinnati, Cleveland, Pittsburgh, San Francisco (11.50-cent zinc) and in Birmingham (coating extra excluded); ‡includes 25-cent special bar quality extra; §as rolled; **¼-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999; [a]—500 to 9999 lb; [c]—4000 lb and over; [d]—1000 to 1999 lb; [e]—1000 lb and over; [f]—1500 lb to 2999 lb; [g]—f.o.b. local delivery in lots of 10,000 lb and over.

Avondale ... now 4 divisions

with STEEL as their tool

Steel in the hands of Avondale's skilled workmen means an expert job performed in a minimum time. Avondale's 4 major facilities • Main Yard • Harvey "Quick Repair Yard" • Service Foundry • and Avoncraft use steel day in and day out . . . for the Maritime Industry for steel ships and equipment of all kinds . . . steel for the Oil Industry for drill rigs, barges, and service stations . . . steel for the Navy and U. S Engineers jobs. Yes, steel is the tool with which Avondale builds, repairs and fabricates to serve the growing needs of industry everywhere.

SERVICE • INTEGRITY • EFFICIENCY

SHIP BUILDING · SHIP REPAIRING · FOUNDERS · PROPELLERS · STRUCTURAL STEEL

AVONDALE MARINE WAYS, INC. CABLE ADDRESS "AVONWAYS"

P. O. BOX 1030 • PHONE UNiversity 4361 • NEW ORLEANS 8, U. S. A.

STEEL

Copper and Its Alloys: Use by States

Per Cent of U. S. Total—First half, 1952

Ohio	12.57	Ala.	0.54	Vt.	0.06
N. Y.	11.49	Md.	0.54	Wash.	0.06
Pa.	10.89	W. Va.	0.51	Ark.	0.05
Ill.	10.42	Tex.	0.41	S. C.	0.02
Mich.	9.56	Va.	0.30	Fla.	0.01
Conn.	9.50	N. H.	0.27	Oreg.	0.01
Ind.	5.88	Colo.	0.20	Ariz.	*
N. J.	5.25	Ga.	0.20	D. C.	*
Mass.	4.73	Tenn.	0.15	Idaho	*
Wis.	3.88	Kans.	0.13	Miss.	*
Calif.	3.58	Okla.	0.13	Mont.	*
R. I.	2.98	Del.	0.10	Nev.	*
Mo.	2.60	Me.	0.08	N. Mex.	*
Ky.	1.01	N. C.	0.08	N. Dak.	*
Minn.	0.92	La.	0.07	S. Dak.	*
Iowa	0.76	Nebr.	0.06	Utah	*
				Wyo.	*

*Some used, but very little.
U. S. Bureau of the Census.

Copper and Its Alloys: Where the Users Are

NEW ENGLAND owes a lot, perhaps, to brass buttons.

If it weren't for them that area might not be the big user it is of copper and copper-base alloys.

At the dawn of the 1800s, the independence-loving Yankees decided to make brass buttons in the Waterbury, Conn., area rather than import them. This gave New England such a head start in the usage of copper and brass that it still holds on to third place despite the movement westward of the center of metalworking.

Big Three—As a user of steel, New England is small. It consumes only 2.74 per cent of the carbon steel used in the United States. But it uses 17.62 per cent of the copper and copper-base alloys. As a consumer of copper and copper-base alloys New England is exceeded only by the East North Central and Middle Atlantic regions. They take 42.31 per cent and 27.63 per cent, respectively.

These positions are revealed in the U. S. Census Bureau's "Facts for Industry, series NPAF-1-02." This is the first geographic report on metals consumption since five years ago. It is based on 1952 consumption of metals in five major industry groups.

The Leader—Ohio—in the East North Central region—tops all of the states as a consumer of copper and copper-base alloy mill shapes and castings. It took 12.57 per cent of the tonnage in 1952. Connecticut, the granddaddy, placed sixth that year with 9.5 per cent and did a lot toward putting New England up into third place. Of the other five New England states, Massachusetts and Rhode Island were important with percentages of 4.73 and 2.98, respectively.

The northeastern regions—New England, Middle Atlantic and East North Central—used most of the copper consumed in the U. S. in 1952. They took 87.56 per cent. At the same time, they used only 78.3 per cent of the carbon steel.

Leading Products—In New England, the leading classification in copper and copper-base alloy consumption is alloyed sheet, strip and plate. That group accounted for a third of the area's consumption. Second in importance is alloyed bar, rod and wire (including extruded shapes). In the Middle Atlantic region, castings and powder were the leading consuming classification, with wire mill products second.

In the East North Central region, castings and powder were also the

This is the third of four articles on the geographic location of consumers of metals. It covers copper and copper-base alloy mill shapes and castings. The fourth article will be on aluminum. The first two articles covered steel and appeared on p. 125 of the Jan. 17 issue and p. 113 of the Jan. 24 issue. For reprints of these articles, write to the Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.

leader but alloyed bar, rod and wire (including extruded shapes) were second.

Castings and powder are the leading classification in the South Atlantic, East South Central, and Pacific regions. In the West North Central region, alloyed bar, rod and wire (including extruded shapes) make up the leading classification of consumption, and in the West South Central area the leader is alloyed pipe and tubing.

A product breakdown for the Mountain region is not made because of the small amount of material used there.

Tubular Goods . . .

Tubular Goods Prices, Page 108

About 14,000 miles of pipelines to carry oil, gasoline and natural gas will be laid in the United States this year, according to an estimate by G. Austin Manuel, Pittsburgh, president, the Pipe Line Contractors Association.

Speaking at a convention in Los Angeles, Mr. Manuel said 11,000 miles of main transmission lines costing $170 million were laid in 1954.

Inventory reduction by well drillers has slowed down or ceased, but the market for oil country goods continues highly competitive. Demand, while improving, must be shared with producers located near the oil fields, say Pittsburgh makers.

Merchant pipe producers at the latter point look for fairly active demand during February and March.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 105 & 106

While consumers are still actively pressing for sheets and strip, cracks are beginning to appear in the market. Nothing noteworthy has developed to indicate a slackening in demand, but indications are the point is nearing when consumer pressure will ease.

At any rate, from the New York area comes the report that despite brisk demand for cold-rolled and galvanized sheets, there are indications more tonnage is being ordered than is being consumed, or is likely to be consumed in the near future. An element of "scare" buying is involved and producers are endeavoring to discourage this type of procurement.

Chicago district mills continue under pressure, being committed through first half on cold-rolled, galvanized and enameling sheets but it is generally felt in the trade that currently tight supply items are likely to be more readily available in second quarter than they are at present.

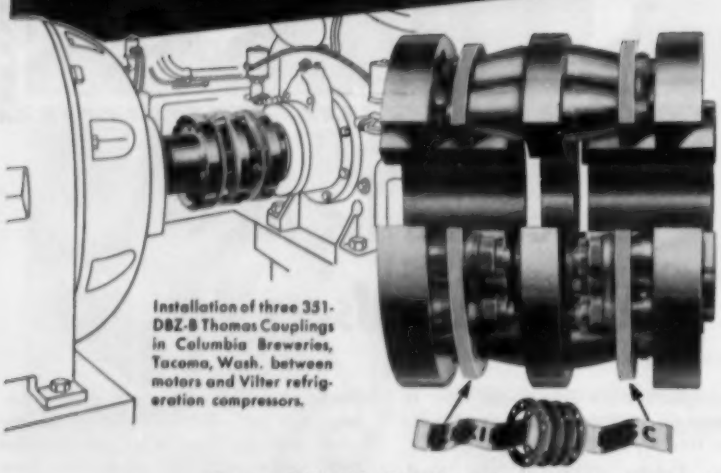
One indication that there is some overstocking by consumers is the fact warehouse demand has not kept pace, relatively, with direct mill buying. It is reasoned that if consumers were operating at the rate indicated by their mill purchases there would be more buying from distributors. Some warehouses are reported cancelling galvanized sheet orders, apparently feeling they have too much tonnage under commitment despite extended delivery in this product.

Hot-rolled sheets are available for shipment from mills within three to four weeks. Cold-finished and continuous galvanized sheets, however, cannot be had before late second quarter. The same is true of such specialties as enameling, silicon and electro-coated sheets. Stainless volume, in spots, is reported double that of last January.

Strong appliance demand is adding to the pressure on the mills stemming from continued heavy automotive requirements. The latter, however, are expected to slacken by May.

One producer of strip in the Pittsburgh area is currently operating 120 hours weekly on requirements of auto

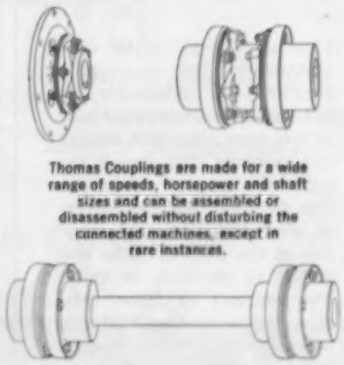
THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

AUTOMATION

The Magazine of Automatic Operations

gateway to the entire automatic operations market

AUTOMATION Magazine covers all phases of automatic production—cuts across all industries. Big now—the rate at which this market is growing—indicates a tremendous growth opportunity for any product or service that can help make operations more automatic. The time to hit this market hard in AUTOMATION is 1955.

needed by the men who are automating their production

They have the green light for full speed ahead on more automatic production to cut costs—raise quality standards. Now they urgently need more information on the fast moving developments in this field—more information on what your product or service can do to help. The high reader interest they have in AUTOMATION Magazine can be documented by hundreds of letters from management, production and engineering executives throughout every industry.

fills the gap in information sources

Busy men charged with the responsibility for revamping their production set-up have wanted one source of authentic information on automatic production. Now this gap has been filled by AUTOMATION Magazine. Concentrating solely on the task of encouraging and helping all industry achieve more automatic production, AUTOMATION has overnight become "must reading" with the very men you want to reach.

quickest way to more sales for:

- Conveying Equipment
- Data Handling Equipment
- Gaging, Testing and Weighing Equipment
- Hydraulic & Pneumatic Controls and Parts
- Handling, Feeding and Indexing Devices
- Instrumentation and Components
- Machine Fixtures, Components and Special Devices
- Motors, Drives and Controls
- Plant and Process Designers and Builders
- Special Machinery and Machine Tools
- Visual and Audible Signal Devices

If you have a product that fits this market, put AUTOMATION Magazine on your '55 schedule to help you get the jump on competition.

this audience across all industry has one common goal—more automatic operations!

For complete information see our new Data File.

SIC NO. AND DESCRIPTION	Total	Copies in Company Name	Corporate Officials and Gen. Mgrs.	Mfg., Production and Processing Mgrs. and Supts.	Engineering Dept. Heads and Design and Plant Engineers	Purchasing, Sales and other Personnel
10-14 Mines	522		44	404	74	
20 Food and Kindred Products	1340	6	210	203	917	4
21 Tobacco Manufacturers	62		10	9	43	
22 Textile Mill Products	965		203	97	664	1
24 Lumber and Wood Products	403		112	66	225	
25 Furniture and Fixtures	181		44	42	95	
26 Paper and Allied Products	734	1	98	126	508	1
27 Printing, Publishing and Allied Industries	179		14	28	134	3
28 Chemicals & Allied Products	1348	9	173	281	884	1
29 Petroleum & Coal Products	427		27	68	332	
30 Rubber Products	211		20	34	157	
31 Leather & Leather Products	213		37	26	150	
32 Stone, Clay & Glass Products	765	1	78	157	529	
33 Primary Metal Industries	1482	6	479	447	545	5
34 Fabricated Metal Products	1547		522	350	672	3
35 Machinery, except Electrical	5187	12	1657	843	2625	50
36 Electrical Machinery, Equipment & Supplies	1950	12	471	381	1056	30
37 Transportation Equipment	1732	26	379	524	791	12
38 Instruments, Optical Goods, Watches & Clocks	605	6	154	116	321	8
39 Miscellaneous Manufacturing Industries	227		41	41	143	2
89 Consulting & Industrial Engineering Firms	937	4	624	6	290	13
Miscellaneous Industries including Ordnance, Banks, Insurance Companies, Educational, Trade Associations, Libraries, etc.	40	13	9	2	7	9
TOTAL	21057	96	5406	4251	11162	142
PERCENTAGE	100.00	0.46	25.67	20.19	53.00	0.68

If your product belongs in automatic operations, your advertising belongs in

a Penton publication

AUTOMATION

The magazine of automatic operations

Penton Building, Cleveland 13, Ohio

builders and general fabricators.

Sheet and strip production is at virtual capacity, but larger output is in immediate prospect with new facilities coming into operation.

Navy Supply Office, Philadelphia, will close bids Feb. 7 on 735 tons of zinc-coated flat steel strapping. India Supply Mission, Washington, is asking bids until Feb. 14 on 13,020 long tons of plain black carbon sheets.

Alan Wood Steel Co., Conshohocken, Pa., has started operation of its new cold-rolled strip mill at Ivy Rock, Pa. The mill has initial annual capacity of 144,000 tons of cold-rolled strip and sheet.

Wire . . .

Wire Prices, Pages 106 & 107

Early improvement in demand for merchant wire products, such as fencing and other agricultural items, is anticipated by producers. Such buying will give the merchant products trade an urgently needed boost.

Meanwhile, manufacturers wire is reported moving in moderately good volume, notably automobile spring wire and screw machine products.

In New England, consumers of industrial grades of finished wire are not anticipating requirements.

Plates . . .

Plate Prices, Page 104

Inquiry for plates is being stimulated by the appearance of European demand, a turnabout from some months back when European plates were being offered in this country at prices well below the general level of the domestic market.

Need of certain western European countries for more steel than they are producing is further indicated by the movement of some semifinished steel from the United States for the first time in a long while.

In addition to foreign inquiry, plate demand is being helped a bit by a modest but steady flow of orders from the Navy. Over-all buying still lags, however.

Pittsburgh mills note a slight pick-up in volume, reflecting freight car orders. Some equipment recently was placed for India. Demand in general, though, is spotty. District producers think there will be no major pickup in railroad buying this year. Most plate fabricators are satisfied with low inventories and have no incentive to stock larger amounts. Large pipeline projects are expected to require heavier shipments of plates as the weather improves late this quarter.

Fabricating plants in New England using a range of finished products are placing forward orders in line with delivery schedules. This places carbon plates well in the rear. Where an individual shop may be covered through June on cold-rolled sheets, it has done virtually no forward buying of plates, on which deliveries are available under two weeks, except on clad material. This makes for spot buying. As a result, orders are small but fairly plentiful.

Small plate fabricators in the Pacific Northwest report business slow.

Award of contracts for 15 tankers has been postponed to Mar. 1 by the Military Sea Transportation Service. Contracts were to have been placed Jan. 20 but shipbuilders asked for postponement to clarify details.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 104

What amounts to a flood of proposed construction jobs is serving to enliven the reinforcing bar market on the West Coast. At Los Angeles, for example, substantial tonnages are reported scheduled for placement next month. In the Pacific Northwest a satisfactory volume of orders is developing as public works and general construction continue at high levels in the area.

Following recent award of 3300 tons of reinforcing bars for The Dalles dam navigation lock, the same Portland, Oreg., fabricators will furnish approximately 6000 tons of bars for another phase of this same project. Still unplaced in the area are 1000 tons for Seattle's Gorge dam; also about the same tonnage for Washington state highway work.

Steel Bars . . .

Bar Prices, Page 104

Trading in merchant steel bars shows some improvement, but demand continues far from active. Deliveries still range three to four weeks on hot-rolled carbon bars and four to six weeks on cold-drawn where material is not available from stock. Most cold drawers, however, offer at least a limited range of sizes from stock.

While smaller sizes are moving best in the Philadelphia market, there is somewhat better activity there in the larger sizes of hot carbon bars and, in general, volume continues to inch upward with demand diversified.

Both carbon and alloy bar volume is improving slowly in New England. Prompt shipments, from stock and new rollings this quarter, hamper forward buying. Demand for heavy

(*Please turn to page* 118)

PUNCHES·DIES

RIVET SETS · COMPRESSION RIVETER DIES

Made of highest standards and uniform quality thus insuring maximum service.

Since 1903

Large inventory of stock sizes of round punches and dies—also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

Write Dept. A for New Catalog 54

GEO. F. MARCHANT COMPANY

1420-34 So. ROCKWELL STREET · CHICAGO 8, ILLINOIS

Whiting standard 26" ladle and truck, equipped with EZ-Pour gearing and insulated cover. Has closed standards and no bail. Truck has 16" dia. wheels for 24 gauge track. Other gauges available.

Whiting teapot-spout crane ladle, 51" in diameter. Has special reinforcing around bowl and spout is equipped with EZ-Pour gearing.

SPECIALLY ENGINEERED LADLES for special service

SPEED POURING... CUT COSTS!

Whiting knows ladles. Proof is the thousands of Whiting ladles in use . . . *reason* is Whiting's 70 years' experience building these ladles. That's why Whiting can give you the ladle you want and need. That's why Whiting's special engineering service means the best possible performance at the lowest possible cost.

For example, take a look at the specially engineered Whiting ladles shown on this page . . . only a few of many designed for specific applications. With such special features as structural steel spouts, riveted or welded heads and extra reinforced bowls, they withstand the toughest day-in-day-out, year after year service.

Remember, too—in addition to the "specials", Whiting carries a complete line of standard ladles . . . all known for their longer-lasting, economical performance. They include hand and shank ladles, covered trolley ladles, covered crane ladles, riveted crane ladles, geared and non-geared bottom-top ladles, cylindrical ladles, mixing and reservoir ladles.

Send today for complete information on all Whiting Ladles!

Whiting special 66" top diameter square bail combination lip and bottom pour ladle with laminated bail arms and heat shield, anti-friction trunnion bearings and helical worm gear bracket.

WHITING

Mail this coupon today!

WHITING CORPORATION
15643 Lathrop Avenue, Harvey, Illinois

☐ Send Me A Whiting Ladle Catalog
☐ Have A Whiting Engineer Call

Firm _____

Attention _____

Address _____

City _____ Zone _____ State _____

This is under no circumstances to be construed as an offering of these securities for sale, or an offer to buy, or as a solicitation of an offer to buy, any of such securities. The offer is made only by means of the Prospectus.

NEW ISSUE

Northeastern Steel Corporation

$4,600,000 6% Subordinated Debentures,
Series A, Due February 1, 1975
920,000 Shares Common Stock (Par Value $1 Per Share)
Common Stock Purchase Warrants for
276,000 Shares of Common

being offered in

92,000 UNITS

Each Unit Consisting of a $50 registered Debenture, 10 Shares of Common Stock and an eight-year Warrant to Purchase 3 Shares of Common Stock at $8.33⅓ Per Share Payable in Cash or Debentures at Par.

Price: $100 Per Unit

Copies of the Prospectus may be obtained only from such of the underwriters, including the undersigned, as are registered dealers in securities in this State.

Estabrook & Co. — **White, Weld & Co.** — **F. S. Moseley & Co.**

Lee Higginson Corporation — **Coffin & Burr Incorporated** — **Putnam & Co.**

Cooley & Company — **Auchincloss, Parker & Redpath**

Townsend, Dabney & Tyson — **Chas. W. Scranton & Co.** — **R. L. Day & Co.**

Chace, Whiteside, West & Winslow Incorporated

Blunt Ellis & Simmons — **Robert W. Baird & Co., Incorporated**

Edward M. Bradley & Co., Inc. — **Hincks Bros. & Co., Inc.**

Bateman, Eichler & Co. — **Eddy Brothers & Co.** — **Hallowell, Sulzberger & Co.**

Schmidt, Poole, Roberts & Parke — **Childs, Jeffries & Thorndike Incorporated** — **Burgess & Leith**

F. L. Putnam & Company, Inc. — **Smith & Company** — **Richard W. Clarke Corporation**

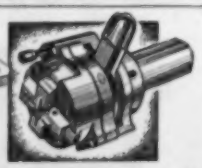
January 20, 1955

LOVEJOY
✓ FLEXIBLE COUPLINGS
✓ VARIABLE SPEED PULLEYS and TRANSMISSIONS
✓ UNIVERSAL JOINTS
✓ MOTOR BASES
Send for Catalogs on Company letterhead

LOVEJOY FLEXIBLE COUPLING CO.
4871 WEST LAKE STREET, CHICAGO 44, ILLINOIS

To Lower your Overhead..
BROWNING ELECTRIC TRAVELING CRANES AND HOISTS
up to 125-TON CAPACITY
VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland) OHIO

H&C Insert Chaser DIE HEADS



famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

THE EASTERN MACHINE SCREW CORP., 22-42 Barclay Street, New Haven, Conn.
Pacific Coast Representative: *A. C. Berbringer, 334 N. San Pedro St., Los Angeles, California.* Canada: *F. P. Barber Machinery Co., Toronto, Canada.*

Versatility counts in
HOT DIP GALVANIZING
any size or shape product, any size
order from the smallest to the largest

Excellent facilities for pickling and oiling

ENTERPRISE
GALVANIZING COMPANY
2523 E. Cumberland Street Philadelphia 25, Pa.

INTRODUCTION TO THE STUDY OF HEAT TREATMENT OF METALLURGICAL PRODUCTS
By Albert Portevin

Fundamental knowledge and essential principles of heat treatment of steel are presented in simple and understandable manner. Research engineers, metallurgical students and steel plant metallurgists engaged in metallurgical investigations and the heat treatment of ferrous and non-ferrous metals will find this book of inestimable value.

246 pages — 4 tables
69 illustrations — Price $5.00 Postpaid

THE PENTON PUBLISHING CO.
Book Department, 1213 W. 3rd St., Cleveland 13, O.

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $56, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.8c for max 0.15% C grade from above prices, 3c for max. 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 38c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 34.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 63-66%, C 5-7%). Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.25 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.05c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Boroxil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.05c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 2 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 11.85c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.45c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 8.55c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.7c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 55-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $12 per lb of contained Cb, less ton $12.05. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $6.25 per lb of contained Cb plus Ta, deld.; less ton lots $6.30.

Silicon Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.25c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200 lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity, $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington, Pa., $1.24.

(*Concluded from page 114*)

turbine blades, forged and machined, is active and is bolstering stainless bar orders.

Hot-rolled carbon bars are being specified in better volume in the Midwest than had been anticipated. A similar situation prevails in cold-finished bars.

Pittsburgh mills report demand for both hot-rolled and cold-drawn bars has leveled out at a point somewhat above that of last year.

Structural Shapes . . .

Structural Shape Prices, Page 104

Structural shape supply has tightened slightly since the turn of the year, but fabricators are encountering little difficulty in getting all the steel they want within four weeks.

Demand for structurals is holding up well in the East considering the season. At Chicago the outlook for business appears promising with substantial demand for highways, bridges and power houses in prospect. However, district shops do not have enough work in hand currently to maintain full operating schedules.

Competition is sharp for fabricated bridge steel tonnage in New England. Bidding is frequently under engineers' estimates. Not only are most New England shops estimating bridge work, but larger outside fabricators are competing more actively for business in the area.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2500 tons, widening 30 bridges along the New Jersey turnpike, to Belmont Iron Works, Eddystone, Pa.

1300 tons, fabricated roof framing, The Dalles dam power house, to American Bridge Division, U. S. Steel Corp., Portland, Oreg., by Montag-Halvorson-Cascade-Austin, general contractors.

975 tons, northeast state turnpike extension, section 36-D, Lehigh county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

800 tons, state thruway bridgework, section 54-4, Bronx, New York, to Central Iron Works, Bronx, New York.

570 tons, building, Scott Paper Co., Detroit, to American Bridge Division, U. S. Steel Corp., Pittsburgh; Charles T. Main Co., Boston, engineer.

540 tons, bridge, Queens midtown expressway, contract 8, Queens, New York, to Central Iron Works, Bronx, New York.

510 tons, two stringer bridges, Dedham-Westwood, Mass., to West End Iron Works, Cambridge, Mass.; Monroe-Langstroth Co., Norwood, Mass., subcontractor for bridges.

500 tons, fabricated steel switch structures, The Dalles dam, to Bethlehem Pacific Coast Steel Corp., Seattle.

450 tons, Catholic high school, Norristown, Pa., to Frank M. Weaver Co., Lansdale, Pa.

395 tons, four bridges, Massachusetts turnpike, Warren-Brimfield-Sturbridge, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh; L. G. DeFelice & Sons, North Haven, Conn., general contractor.

310 tons, warehouse and miscellaneous buildings, Otis Air Force Base, Falmouth, Mass., to Providence Steel & Iron Co., Providence, R. I.; Theodore Loranger & Sons, New Bedford, Mass., general contractor; 65 tons, reinforcing bars, Bethlehem Steel Co., Bethlehem, Pa.

230 tons, DuPont addition, Carney's Point, Pa., to Belmont Iron Works, Eddystone, Pa.

225 tons, Washington state bridge, Whatcom county, to Poole, McGonigle & Dick, Portland, Oreg., by Rumsey & Co., Seattle, general contractors.

225 tons, public school No. 130, Bronx, New York, to Central Iron Works, Bronx, New York. (Through error this was previously reported as going to the Central Structural Steel Co., Bronx, New York.)

200 tons, substation and station platform, broad channel, Rockaway Beach, Queens, New York, through the New York Transit Authority, to Central Iron Works, Bronx, New York.

115 tons, school, New Bedford, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Vara Construction Co., Boston, general contractor.

115 tons, DuPont laboratory, New Castle, Del., to Bethlehem Fabricators, Bethlehem, Pa.

100 tons, laboratory, research center, air base, Bedford, Mass., to Hub Steel & Iron Works, Boston (structurals) and Joseph T. Ryerson & Son Inc., Cambridge, Mass. (bars); Platt Construction Co., Cambridge, general contractor.

100 tons, including bars, high school Westbrook, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; C. Profenno Co., Portland, Me., general contractor.

STRUCTURAL STEEL PENDING

2000 tons, two state office buildings, Albany, N. Y., Brown-Turner Co., New York, low on general contract.

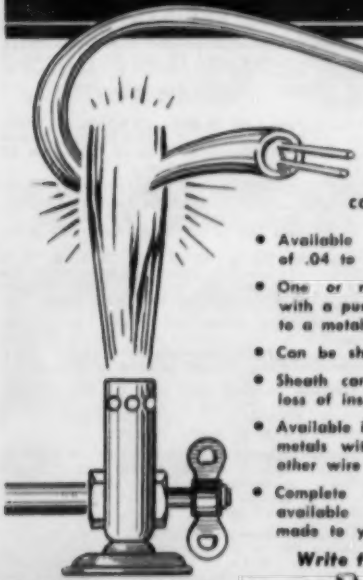
2000 tons, New York School of Printing, New York, bids closed by the Municipal Board of Education Jan. 28.

1750 tons, also 85 tons reinforcing, superstructure, Washington state First Ave. South bridge, Seattle; Alton V. Phillips, Seattle, low at $1,272,990.

1725 tons, 9-span stringer bridge, Quaboag river, Massachusetts turnpike, Brimfield-Palmer, Mass.; Gilbane Building Co., Providence, R. I., low, general contract.

1675 tons, 10 bridges, Massachusetts turnpike,

INSULATED WIRE
that will withstand 2000°F



Will last forever in service—eliminating costly replacement

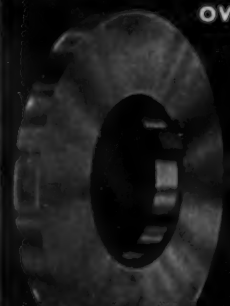
- Available in outside diameters of .04 to .32.
- One or more wires insulated with a pure mineral swaged into a metal tube.
- Can be sharply bent.
- Sheath can be welded without loss of insulation.
- Available in a variety of sheath metals with thermocouples and other wire materials.
- Complete thermocouple probes available using this material made to your requirements.

Write for Bulletin 6A

aero research
INSTRUMENT COMPANY, INC.
1901 NORTH HERMITAGE AVENUE CHICAGO 22, ILLINOIS
New York, Philadelphia, Detroit, Dallas, Los Angeles San Francisco and Seattle

The Cleveland Steel Tool Co.
• PUNCHES • DIES • CHISELS • RIVET SETS •
IF IT'S RIVETED YOU KNOW IT'S SAFE
•
WE FEATURE SPECIAL PUNCHES & DIES
660 E. 82nd ST., CLEVELAND, O.

COWLES
GANG SLITTING KNIVES
OVER 30 YEARS EXPERIENCE



Standard for Service and Durability. Ground to extremely close Tolerances and Finish. Made by Toolmakers.

COWLES
TOOL COMPANY
2086 W. 110th ST. CLEVELAND 2, OHIO

Grafton-Westboro-Upton-Hopkinton, Mass., Gilbane Building Co., Providence, R. I., low, general contract.

100 tons, jail equipment, Ellensburg, Wash.; Decatur Iron & Steel Co., Decatur, Ala., low at $44,024.

REINFORCING BARS . . .

REINFORCING BARS PLACED

6000 tons, The Dalles dam power house, to Steel Construction Co. of Oregon, Portland, Oreg., by Montag-Halvorson-Cascade-Austin, general contractors.

425 tons, school, New Bedford, Mass., to Northern Steel Inc., Medford, Mass.; Vara Construction Co., Boston, general contractor.

400 tons, municipal sewage disposal plant, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, New Jersey state highway, sec. 11, contract 176, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, Y.M.C.A., Chester, Pa., to Truscon Steel Co., Philadelphia.

136 tons, Washington state undercrossing, Spokane, Wash., to Northwest Steel Rolling Mills Inc., Seattle; Henry Hagman, Cashmere, general contractor, low at $77,890.

120 tons, addition to Washington state training school, Chehalis, Wash., to James D. English Steel Co., Tacoma, Wash.

REINFORCING BARS PENDING

800 tons, Washington state South Bay bridge, Grays Harbor county; general contract to Peter Kiewit Sons Co., Longview, Wash., low at $694,914.

300 tons, 4-story addition, Sears-Roebuck, Seattle; bids in.

170 tons, installation for Air Force, Naknek, Alaska; bids in.

105 tons, Kittitas county courthouse, Washington; Cherf Bros. Inc. and Sandkay Contractors Inc., Ephrata, Wash., low at $713,310.

PLATES . . .

PLATES PENDING

1775 tons, 20,000-ft 36-in. and 5000-ft 20-in., pumps, etc., water supply project, Anacortes, Wash.; alternative bids for concrete pipe; bids Feb. 1; Carey & Kramer, Seattle, engineers.

600 tons, oil storage tanks, Naknek, Alaska, air base; Morrison-Knudsen Co., Inc., Seattle, low base at $4,099,487 to U. S. Engineer; project includes shops, pump house, facilities, etc.

PIPE . . .

CAST IRON PIPE PLACED

132 tons, 12 and 8-in. for Seattle, to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

151 tons, Mt. Vernon, Wash., and Astoria, Oreg.; bids Feb. 9 and Feb. 4, respectively.

102 tons, bids to Napavine, Wash., Feb. 8.

RAILS, CARS . . .

RAILROAD CARS PLACED

General Services Administration and Foreign Operations Administration, Washington, 1650 wide gage gondolas with capacity of approximately 20 metric tons each, for the Indian Railways, India, to the Magor Car Corp., New York.

Rutland Railway, 60 PS-1 box cars, to Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Army Transportation Corps, Marietta, Pa., three caboose cars; bids Feb. 7.

RAILS PLACED

New York Central, 10,000 tons, 6500 tons to Bethlehem Steel Co., Bethlehem, Pa., 3000 tons to U. S. Steel Corp., Pittsburgh, and 500 tons to Inland Steel Co., Chicago.

The Dalles dam, Oreg., 200 tons, steel rails to American Bridge Division, Portland, Oreg., by Montag-Halvorson-Cascade-Austin, general contractors.

RAILS PENDING

New York, New Haven & Hartford, 30,000 tons.

Ores

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 63-62% concentrates contract 17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
N. African hematite (spot)	nom. 29.00-32.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign, Wolframite, good commercial quality	$25.00-$26.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 90c-92c per long ton unit c.i.f. U. S. ports, duty for buyer's account: 46-47%, 80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

(Rail nearest seller)

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$3.35-$3.85
60-65%	4.00-4.35

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	$1.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Farral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $114; Salina, Pa., $119; Niles, O., $120; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $130; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.56; Los Angeles, $127.85.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $142.

Semisilica Brick (per 1000)

Clearfield, Pa., $130; Woodbridge, N. J., $114.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O. $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Paris, Ark., $109; Los Angeles $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $180.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo. Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo. $380; Danville, Ill., $258; Clearfield, Pa. $267.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.80; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $287.50.

Runners (per 1000)

Reesdale, Pa., Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.80; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¼-in. grains with fines: Luning, Nev., Chewelah, Wash., $35.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$34.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa. ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

(Threaded with nipple, unboxed f.o.b. plant)

Diam.	Length	Per 100 lb
	GRAPHITE	
	Inches	
2	24	$47.75
2½	30	30.75
3	40	30.00
4	40	28.50
5½	40	28.25
6	60	25.50
8, 9, 10	60	22.75
12	72	22.25
16	72	21.50
17	60	22.00
18	72	21.50
	CARBON	
40	100	$9.50
40, 35	110	9.50
30	84	9.75
24	96	9.60
24	72, 84	9.85
20	90	9.65
20	84	9.85
17	72	9.85
17	60	10.25
14	72	10.25
14, 12, 10	60	11.10
8	60	11.40

A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

Luria Brothers and Company, Inc.

MAIN OFFICE

LINCOLN-LIBERTY BLDG.

Philadelphia 7, Penna.

PLANTS

LEBANON, PENNA.
READING, PENNA.
MODENA, PENNA.
DETROIT (ECORSE), MICHIGAN
PITTSBURGH, PENNA.
ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA.
BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILLINOIS
CLEVELAND, OHIO
DETROIT, MICHIGAN
HOUSTON, TEXAS
LEBANON, PENNA.
LOS ANGELES, CAL.
NEW YORK, N. Y.
SEATTLE, WASH.
PITTSBURGH, PENNA.
PUEBLO, COLORADO
READING, PENNA.
ST. LOUIS, MO.
SAN FRANCISCO, CAL.

EXPORTS-IMPORTS—LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

Because demand for TV antenna tubing is rising . . .

J&L's Oil City Plant Gets Face Lift

WHEN THE WAGS get around to revising Joyce Kilmer's poem to "I think that I shall never see a TV antenna lovely as a tree," Jones & Laughlin Steel Corp. will concur, but will add: "Each new branch added to the metallic forest is a sign of good business." About 35 per cent of J&L's electricweld tube sales are going to producers of TV masts.

As the omnipresent TV antenna has changed the face of the nation, J&L's electricweld tube division has taken on a new look, too. The goal is to make production "as close as we can design it to being 100-per-cent automatic," says Dale B. Kennedy, manager of the division's plant at Oil City, Pa.

Special Handling—Tube for television masts gets special treatment. Ends of the tubing are swaged and expanded to form a fitted joint, making possible telescoping of one piece of tubing into another.

The electricweld division uses flat-rolled coiled strip steel from 0.022 to 0.154 in. thick, weighing from 3000 to 10,000 lb per coil and varying from 24 to 33½ in. in width.

Corrosion-resistance is a must, and the painting and finishing line is geared to apply a corrosion-proof coating inside and out. This necessitated improvement of a conveyor system to feed uncoated tubing rapidly to the automatic dip line.

Growing Applications—The lengthening list of end product uses for plastic-coated and uncoated steel tubing produced at Oil City includes automotive parts, farm equipment, furniture, bicycle frames, playground equipment and building columns. But television masts make up an increasingly important segment of sales.

Other activities at Jones & Laughlin: The official opening (Jan. 25) of the new Warehouse & Container Division plant at Lancaster, Pa. The 100,000-square-foot building will include a warehouse to serve customers in eastern Pennsylvania, Delaware, Maryland and West Virginia and facilities to manufacture 5 and 3½-gallon steel shipping pails.

Revise Steel Output Upward

Revised figure for steel ingot production in 1954 is reported by the American Iron & Steel Institute at 88,311,652 net tons. The revised total for December is 8,287,073 net tons.

Alloy steel production last year totaled 7,151,263 net tons, or about 8 per cent of total steel output. In December, the production of alloy steel was 762,765 net tons, highest for any month of last year.

Scrap . . .

Scrap Prices, Page 123

Philadelphia — Fairly substantial buying by the Fairless, Pa., consumer has imparted strength to the local scrap market. This buyer closed on an estimated 30,000 tons, comprising five grades: No. 1 heavy melting, No. 1 bundles and No. 1 busheling, at $36, delivered, and No. 2 heavy melting and No. 2 bundles, at $33 and $28, delivered, respectively.

These higher prices, reflecting competition with foreign consumers, have not only established advances on these grades in the domestic market but have resulted in an uptrend on most other grades.

Pittsburgh—An unusually large price spread for No. 1 and No. 2 heavy melting scrap as well as No. 1 bundles results from the recent purchase of open hearth scrap at two prices. The divided price prevails at $34.50 to $37 for No. 1 heavy melting. The low of the range represents the price paid for local scrap. The higher price was paid for scrap delivered from outside Pittsburgh.

There is more strength in railroad specialties, but the latest price paid for No. 1 railroad heavy melting resulted in a $1 decrease.

Boston — Steel scrap prices are slightly firmer. For central Massachusetts delivery $27, shipping point, is paid for No. 1 heavy melting steel. For shipment to heavier consuming points, prices are slightly higher, light grades, borings and turnings, excepted.

No. 1 heavy melting steel commands $30, shipping point on material delivered docks for export. However, the freight haul must be within $3.50 to $4, Boston.

New York—Under pressure of active demand, both domestic and foreign, scrap brokers have advanced their buying prices on several grades. They are now paying $29-$30 for No.

(*Please turn to page* 124)

EUREKA FIRE BRICK WORKS
Works: Mt. Braddock, Fayette Co., Pa.
Dunbar, Pa. 4213
COVERED HOT TOP BRICK
INGOT MOLD PLUGS

Sales Office
132 S. Whitfield St.
PITTSBURGH 6, PA. EM: 2-0614

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Jan. 26	$35.25
Jan. 19	34.75*
Dec. Avg.	32.58
Jan. 1954	29.05
Jan. 1950	26.93

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.
*Revised.

PITTSBURGH
(Delivered consumer plant)

No. 1 heavy melting	*34.50-37.00**
No. 2 heavy melting	*31.50-34.00**
No. 1 bundles	*34.50-37.00**
No. 2 bundles	26.00-28.00
No. 1 busheling	36.00-37.00
Machine shop turnings	15.00-19.00
Mixed borings, turnings	15.00-19.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut structurals, 5 ft lengths	37.00-38.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	39.00-40.00
Electric furnace bundles	38.00-39.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Charging box cast	31.00-32.00
Heavy breakable cast	31.00-32.00
Unstripped motor blocks	22.00-23.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00-38.00*
Rails, 2-ft and under	47.00-48.00
Rails, 18-in. and under	48.00-49.00
Rails, random lengths	43.00-44.00
Railroad specialties	*41.50-42.50*

Stainless Steel Scrap

18-8 bundles & solids	190.00-200.00
18-8 turnings	90.00-95.00
430 bundles & solids	85.00-90.00
430 turnings	80.00-62.00

*Low price represents local scrap.

CLEVELAND
(Delivered consumer plant)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.00-34.00
No. 2 bundles	26.00-27.00
No. 1 busheling	33.00-34.00
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	*23.00-24.00*
Cast iron borings	*23.00-24.00*
Low phos.	33.00-34.00
Cut structural plate 2 ft and under	*33.00-39.00*
Alloy free, short shovel turnings	*25.00-26.00*
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Stove plate	38.00-39.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	28.00-29.00
Brake shoes	30.00-31.00
Clean auto cast	43.00-44.00
No. 1 wheels	*39.00-40.00*
Burnt cast	29.00-30.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
R.R. malleable	44.00-45.00
Rails, 2-ft and under	48.00-49.00
Rails, 18-in. and under	48.00-50.00
Rails, random lengths	43.00-44.00
Cast steel	36.00-37.00
Railroad specialties	37.00-38.00
Uncut tires	37.00-38.00
Angles, splice bars	42.00-43.00
Rails, rerolling	52.00-53.00

Stainless Steel
(Brokers' Buying Prices)

18-8 bundles, solids	190.00-200.00
18-8 turnings	80.00-90.00
430 clips, bundles, solids	80.00
430 turnings	40.00-50.00

YOUNGSTOWN
(Delivered consumer plant)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	27.50-28.50
No. 1 busheling	36.00-37.00
Machine shop turnings	*18.00-19.00*
Short shovel turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Low phos.	36.00-37.00
Electric furnace bundles	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00

CHICAGO

No. 1 heavy melting	*33.00-35.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 factory bundles	*35.00-36.00*
No. 1 dealer bundles	33.00-34.00
No. 2 bundles	24.00-25.00
No. 1 busheling	*33.00-35.00*
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*18.00-19.00*
Short shovel turnings	*18.00-19.00*
Cast iron borings	*18.00-19.00*
Cut structurals, 3 ft	36.00-37.00
Punchings & plate scrap	37.00-38.00
Electric furnace bundles	*35.00-36.00*

Cast Iron Grades

No. 1 cupola	39.00-41.00
Stove plate	34.00-35.00
Unstripped motor blocks	*28.00-29.00*
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
R.R. malleable	44.00-45.00
Rails, 2-ft and under	*48.00-49.00*
Rails, 18-in. and under	*49.00-50.00*
Angles, splice bars	43.00-44.00
Rails, rerolling	*49.00-50.00*

Stainless Steel Scrap

18-8 bundles & solids	190.00-195.00
18-8 turnings	95.00-100.00
430 bundles & solids	80.00-85.00
430 turnings	45.00-50.00

Chicago Mercantile Exchange
(Week ended Jan. 26)
No. 1 Heavy Melting

	High	Low	Close
Mar.	37.00	37.00	37.00*

No. 2 Heavy Melting

Feb.			33.00†

Sales (40-ton Units): 3 March.
*Nominal. †Last posted price, Jan. 17.

DETROIT
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	27.00
No. 2 heavy melting	21.00
No. 1 bundles	*28.00*
No. 2 bundles	19.50
No. 1 busheling	26.00
Machine shop turnings	11.00
Mixed borings, turnings	11.00
Short shovel turnings	15.00
Punchings & plate scrap	29.00

Cast Iron Grades

Charging box cast	27.00
No. 1 cupola	34.00
Stove plate	30.00
Heavy breakable	25.00
Unstripped motor blocks	20.00
Clean auto cast	38.00
Malleable	30.00

CINCINNATI
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	31.00-32.00
No. 2 bundles	20.00-21.00
No. 1 busheling	31.00-32.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	19.00-20.00
Cast iron borings	17.00-18.00
Low phos. 18-in.	35.00-36.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	35.00
Charging box cast	36.00
Drop broken machinery	46.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18-in. and under	46.00-47.00
Rails, random lengths	38.00-39.00

PHILADELPHIA
(Delivered consumer plant)

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*33.00*
No. 1 bundles	*36.00*
No. 2 bundles	*28.00*
No. 1 busheling	*36.00*
Electric furnace bundles	*36.00*
Machine shop turnings	*19.50-20.00*
Mixed borings, turnings	*20.00*
Short shovel turnings	*22.50*
Structurals & plate	*36.00**
Heavy turnings	*31.00-32.00**
Couplers, springs, wheels	*36.50**
Rail crops, 2 ft & under	*50.00*

Cast Iron Grades

No. 1 cupola	35.00
Malleable	41.50-43.00
Heavy breakable cast	*37.00-37.50*
Drop broken machinery	*44.00*

*Nominal.

NEW YORK
(Brokers' buying prices)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*26.50-27.50*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*22.00-23.00*
Machine shop turnings	*11.50*
Mixed borings, short turnings	*12.00-13.00*
Low phos. (structural & plate)	*31.00-32.00*
Short shovel turnings	*13.00-14.00*

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	22.00-23.00

Stainless Steel

18-8 sheets, clips, solids	175.00-180.00
18-8 borings, turnings	80.00-85.00
430 sheets, clips, solids	55.00-60.00
410 sheets, clips, solids	45.00-50.00

BOSTON
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*24.50-25.50*
No. 2 heavy melting	20.00-21.00
No. 1 bundles	24.50-25.00
No. 2 bundles	*17.25-18.25*
Mixed borings, turnings	9.50-10.00
Machine shop turnings	8.00-8.50
Short shovel turnings	10.50-11.00
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

BUFFALO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.50-26.00
No. 1 bundles	30.00-31.00
No. 2 bundles	23.50-24.50
No. 1 busheling	30.00-31.00
Machine shop turnings	18.00-19.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	21.00-22.00
Cast iron borings	20.00-21.00
Low phos.	33.50-34.50

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*36.00-37.00*
No. 1 machinery	*41.00-42.00*

Railroad Scrap

Rails, random lengths	35.00-36.00
Rails, 3 ft and under	42.00-43.00
Railroad specialties	36.50-37.50

BIRMINGHAM

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	23.00-24.00
No. 2 bundles	19.00-20.00
Cast iron borings	16.00-17.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	29.00-30.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	33.00-34.00
Structural plate, 2 ft	33.00-34.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	40.00-41.00
Angles, splice bars	38.00-39.00
Stand. steel axles	35.00-36.00

ST. LOUIS
(Brokers' buying prices)

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 1 bundles	31.00
No. 2 bundles	24.50
Machine shop turnings	13.00
Short shovel turnings	15.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	32.50
Heavy breakable cast	32.50
Unstripped motor blocks	32.50
Brake shoes	30.00
Clean auto cast	41.00
Stove plate	36.50

Railroad Scrap

No. 1 R.R. heavy melt.	35.50
Rails, 18-in. and under	48.00
Rails, random lengths	42.00-43.00
Rails, rerolling	43.00
Angles, splice bars	*40.00-41.00*

SEATTLE
(Delivered consumer plant)

No. 1 heavy melting	29.00
No. 2 heavy melting	25.00
No. 1 bundles	21.00
No. 2 bundles	18.00
No. 3 bundles	16.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	12.00
Electric furnace, No. 1	32.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	32.00
Heavy breakable cast	23.00
Unstripped motor blocks	25.00
No. 1 wheels	21.00
Stove plate(f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap
(Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	28.00
No. 2 heavy melting	24.00
No. 1 bundles	27.00
No. 2 bundles	22.00
Machine shop turnings	8.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	24.00
No. 2 heavy melting	20.00
No. 1 bundles	23.00
No. 2 bundles	18.00
No. 1 busheling	24.00
Machine shop turnings	6.00
Mixed borings, turnings	6.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

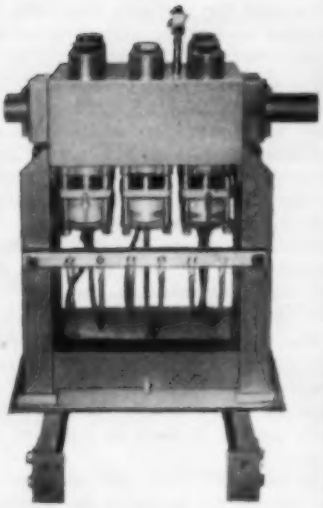
HAMILTON, ONT.
(Delivered prices)

No. 1 heavy melting	*28.50*
No. 2 heavy melting	*25.00*
No. 1 bundles	*28.00*
No. 2 bundles	*23.00*
Mixed steel scrap	*22.00*
Mixed borings, turnings	12.00
Rails, remelting	*37.00*
Busheling, new factory: Prepared	*26.00*
Unprepared	*22.00*
Short steel turnings	12.00

Cast Iron Grades†

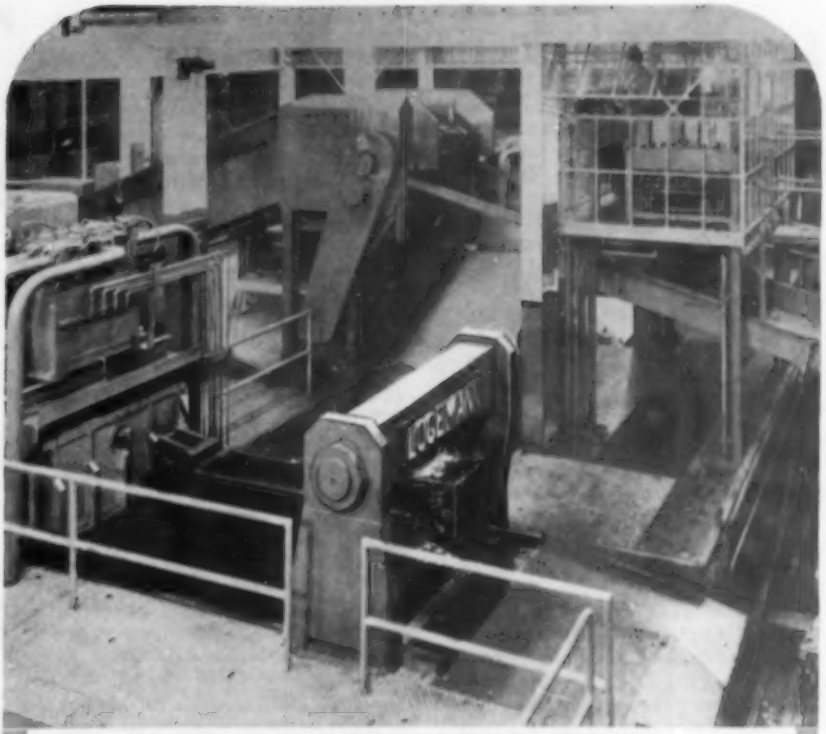
No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.



LOGEMANN HYDRAULIC OPERATING VALVE

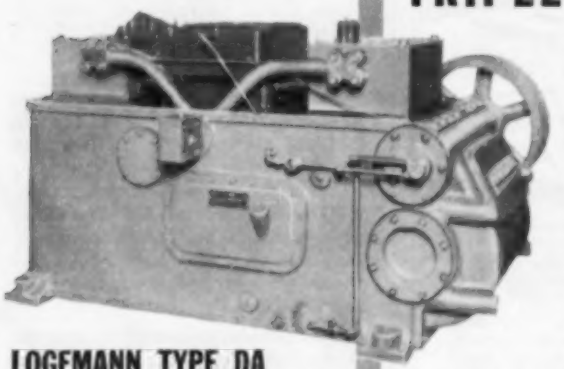
This compact valve was designed to control the movements of the hydraulic rams in large scrap presses but can be modified to suit similar operations on other hydraulic equipment. Interested parties will please outline the nature of the service, operating sequence, gallonage and pressure requirements.



Get low cost, high density bales with LOGEMANN SELF-CONTAINED TRIPLE-COMPRESSION PRESSES

The illustration shows one of two large scrap-press units in a modern automotive plant. Over a period of many years, such units have baled sheet scrap skeletons and trim from metal operations in large industrial plants throughout the country, forming the scrap into high-density bales for re-melting in steel mills. Low baling costs are the result of correct design for heavy duty service, minimum maintenance and operating interruptions, as well as simplicity, accessibility and safety features.

Pioneers in the metal baling field, LOGEMANN engineers embodied in the design those features that have proven dependable over an extended period of years. Some installations in service over 35 years are still operating economically.



LOGEMANN TYPE DA DOUBLE PRESSURE PUMPS

These compact and efficient opposed-cylinder reciprocating-plunger pumps for low and high pressure service lend themselves to a wide range of double pressure applications. They are close-coupled, reliable, and capable of delivering high gallonage, at low and high pressures, at low power costs.

Tell Us the nature of your scrap!

LOGEMANN press sizes are not confined to the large models. Producers of sheet scrap—steel, copper, brass, or aluminum—are invited to submit their scrap baling problems regardless of tonnage. Please state the character of the metal, minimum tonnage to be handled in a given period of hours, range of gauges and, where possible, indicate maximum and minimum lengths and widths of pieces. Experienced sales engineers are available for discussion of your conditions and requirements.

LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

(*Concluded from page 121*)

1 heavy melting and No. 1 bundles, $26.50-$27.50 for No. 2 heavy melting and $22-$23 for No. 2 bundles. Also, they are paying $11.50 for machine shop turnings, $12-$13 for mixed borings and short turnings, $31-$32 for low phos structural and plate and $13-$14 for short shovel turnings. Cast iron grades and stainless steel scrap are unchanged.

Buffalo—Despite local and Canadian buying cast scrap prices dropped $1 per ton here. Mixed sentiment prevails over future prices as dealers ship against old orders. Mills at present are not bidding.

Cleveland—Considerable uncertainty prevails in the scrap market here. Material is moving on old contracts but not much in the way of new buying by the mills or foundries is reported. Nevertheless, prices are holding except on blast furnace grades which are up $2 per ton on three sales the past week. The war scare is seen as generating resistance to any decline in prices even in the absence of active consumer buying.

Cincinnati—The scrap market here is sluggish with demand for all items virtually at a standstill.

Detroit—The little strength showing in the scrap market here is due to buying in other districts. Opening of lake navigation in the spring is expected to have a bullish effect on the market for a couple of months.

St. Louis—Failure of substantial railroad scrap offerings to materially affect prices is regarded significant in the trade. Offerings of three roads totaled 3000 tons of grades heretofore in preferred demand. Yet the only change was a shift to on-track delivery at the old f.o.b. price of $35.50 for railroad heavy melting. Rerollers were in noticeably indifferent demand.

Los Angeles—The steel scrap market is described by dealers as "bullish," but cast iron prices are soft. Demand for No. 2 heavy melting is heavy in some parts of the district, with mills increasing purchases after several weeks inactivity.

San Francisco—Export demand is lending underlying strength to the steel scrap market. A cargo of scrap left last week for Japan, another is leaving this week and several more are destined for February shipment. All are in the 9000 to 10,000 ton class.

Seattle—Dealers think the recent $2 per ton increase on steel scrap will hold for the next two months at least although larger consumers have ample inventories.

GOES OVER BIG for wheeling and dumping heavy materials
Costs Less per Year
Specify Sterling No. 119 HEAVY-DUTY CART
Pneumatic-tired wheels or steel wheels
FIFTY years ago Sterling men had faith that wheelbarrows would "go over big" if made so rugged they would cost users less per year. Response from men of industry proved this Sterling idea to be right! Through the years, Sterling progress has provided wheelbarrows made the way you needed them . . . easy-wheeling, longer-lasting, to cost you less per year, designed for the specific work you do with wheelbarrows and carts. See the whole Sterling line.
Write for Bulletin or see nearest dealer.
Some areas open for dealerships. Write . . .
STERLING WHEELBARROW CO., Milwaukee 14, Wis.
GOLDEN ANNIVERSARY
1904-1954
A HALF CENTURY OF PROGRESS
Look for this Mark of STERLING Quality
Sterling
WHEELBARROWS
A 7846-54

Pig Iron . . .

Pig Iron Prices, Page 169

Demand for pig iron continues to increase moderately, reflecting heavier requirements for castings.

The rise in activity covers many industries: In New England, textile mill equipment plants as well as foundries supplying paper mill machinery, have increased their melt; in the Midwest, operations of automotive foundries hold strong; at Pittsburgh, increased demand comes mainly from foundries producing ingot molds, agricultural and automotive castings.

The boom in residential construction keeps foundries on plumbing and heating equipment operating at a high rate this winter, although activity usually is slack at this time of year.

As indicated, more foundries are in the market for iron and the average size of orders is larger.

Due to increased demand for merchant pig iron, Pittsburgh Coke & Chemical Co. relighted its "A" blast furnace at Neville Island, Pa. This furnace had been idle since April, 1954.

Importations are virtually nonexistent on the east coast and offerings, if any, are small.

Kaiser Steel Corp. is operating only two of its three blast furnaces at Fontana, Calif.

Iron Ore . . .

Iron Ore Prices, Page 119

Consumption of Lake Superior iron ore totaled 67,027,594 gross tons in 1954, reports the Lake Superior Iron Ore Association. This was a decline of about 29 per cent from the 94,887,504 tons used in 1953. The sharp curtailment in blast furnace operations, due to slower steel ingot operations through most of the year, was reflected.

In December, consumption amounted to 6,341,433 gross tons, an increase compared with 5,845,262 in the preceding month, but down from the 7,021,683 tons used by the furnaces in December, 1953.

Stocks of ore at furnaces and on Lake Erie docks on Jan. 1 were 44,017,825 gross tons. This compares with 49,975,495 tons on Dec. 1 and with 48,815,444 tons on Jan. 1, 1954. While stocks at the beginning of this year were down almost 5 million tons from a year ago, they were equal to about a six-month supply based on the December consumption rate.

There were 160 blast furnaces operating in this country and Canada on Jan. 1. This was one less than a

CLASSIFIED

Help Wanted

RESEARCH ENGINEER to take charge of advance research, design and development work on precision cylindrical grinding equipment. Must know fundamentals of electronics, hydraulic and cam-activated controls. Must be thoroughly grounded in machine tool design, assembly and operation and be able to develop ideas into practical product application. Modern plant, location mid-Atlantic state, small town. Salary over $12,000. Reply Box 202, STEEL, Penton Building, Cleveland 13, Ohio.

ELECTRICIAN WANTED

Excellent opportunity in small rolling mill for man with thorough DC rolling mill experience. Give full details regarding education, experience, and desired income. Reply Box 206, STEEL, Penton Building, Cleveland 13, Ohio.

OVERHEAD CRANE SALESMAN WANTED—To cover Ohio and bordering territory. Salary and commission. Reply Box 209, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

PLANT AND PRODUCTION MANAGER, Engineering Graduate (M.I.T.) indoctrinated in practical operating experience. Proven record of accomplishment in efficient plant supervision, control, and cost reduction coupled with amicable labor relations. Reply Box 134, STEEL, Penton Building, Cleveland 13, Ohio.

CHIEF METALLURGICAL ENGINEER—heavy automotive equipment past ten years. Fifteen years metallurgical and engineering research. Continuous record of improved and simplified fabrication and cost reduction. Reply Box 197, STEEL, Penton Building, Cleveland 13, Ohio.

FORGING ENGINEER AVAILABLE AS MANAGER OR ASSISTANT SMALL OR MEDIUM SIZED SHOP. EXPERIENCE COVERS SUPERVISION, ESTIMATING, DESIGNING, PURCHASING, PRODUCTION. REPLY BOX 198, STEEL, PENTON BUILDING, CLEVELAND 13, OHIO.

FORGING ENGINEER AVAILABLE. Over thirty years experience in all phases of drop forge production, engineering and management. Reply Box 204, STEEL, Penton Building, Cleveland 13, Ohio.

TRANSPORTATION SUPERINTENDENT OR ASSISTANT—15 years supervisory experience including carrier railroad and all phases integrated steel plant transportation. Two years management training. Under 40. Reply Box 205, STEEL, Penton Building, Cleveland 13, Ohio.

For Sale

FOR SALE

60,000 lbs. 22 ga. cold roll steel in coils 9" wide, produced to Spec OOS 636, in excellent condition. Mill price. Reply Box 207, STEEL, Penton Building, Cleveland 13, Ohio.

DESIGN ENGINEER

For well-known machinery manufacturer located in New Jersey. Experience in machine design necessary, knowledge of welding helpful. Excellent opportunity. Send resume and salary requirements.

Reply Box 210, STEEL
Penton Building **Cleveland 13, Ohio**

CHIEF INDUSTRIAL ENGINEER
CHICAGO AREA

To head expanding Industrial Engineering Department. Steel mill experience preferred. In reply give full details of experience, education, salary requirements, etc.

Reply Box 208, STEEL
Penton Building **Cleveland 13, Ohio**

LINES WANTED

Two young men, with 26 years combined experience in steel manufacturing operations, starting manufacturer's agency covering Southern states. Strong contacts with key people, particularly in Alabama. Qualified to handle mechanical, electrical or refractory lines. Engineering service available.

Reply Box 203, STEEL
Penton Building **Cleveland 13, Ohio**

MOTORS · GENERATORS
TRANSFORMERS
NEW · REBUILT
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT CO.
PHONE STATION COLLECT GL 6783
P.O. BOX 51 ROCHESTER 1, NEW YORK

RAILWAY EQUIPMENT
FOR SALE
Used — As Is — Reconditioned

RAILWAY CARS—
ALL TYPES
"SERVICE-TESTED"
FREIGHT CAR REPAIR PARTS
For All Types of Cars
LOCOMOTIVES
Diesel, Steam, Gasoline
Diesel-Electric
RAILWAY TANK CARS
STORAGE TANKS
6,000—8,000 and 10,000-Gallon
Cleaned and Tested
CRANES
Overhead and Locomotive
RAILS
New or Relaying
IRON & STEEL PRODUCTS, INC.

General Office
13462 S. Brainard Ave
Chicago 33, Illinois
Phone: MItchell 6-1313
New York Office
50-4 Church Street
New York 7, New York
Phone: BEekman 3-8280
"ANYTHING containing IRON or STEEL"

FORGING AND HEAT TREATING EQUIPMENT FOR SALE
USED—AS IS

1 Model F—1500# Chambersburg Board Drop Hammer. Belt driven. New in 1919. Serial No. 3912-S1. Complete with all parts. In operating condition and may be inspected under power.
1 Model F—1200# Chambersburg Board Drop Hammer. Belt driven. New in 1918. Serial No. 2978-S1. In good operating condition. Can be inspected under power.
1 Model F—1200# Chambersburg Board Drop Hammer. Belt driven. Serial No. 184. In good operating condition. Can be inspected under power.
1 Model F—1200# Chambersburg Board Drop Hammer. Belt driven. Serial No. 2632-S1. New in 1918. In good operating condition. Can be inspected under power.
1 Model F—1000# Chambersburg Board Drop Hammer. Belt driven. New in 1916. Serial No. 3023-S1. In good operating condition. Can be inspected under power.
1—Complete Chambersburg Roller Bearing Type Head Section for 2500# Model F Board Hammer. Serial No. 3519-S2. New in 1942. In good operating condition.
1 2½" Acme belt driven Upsetting Machine. Serial No. M-6291. Complete with all parts. In good operating condition. Can be inspected under power.
1 Water Jacketed Quenching Tank. Inside dimensions 48" wide x 79" long x 3' deep. Excellent condition.
1 Model 15KVA Lepel Converter Spark Gap Type. Serial No. 4898. With automatic turn table and fixtures. Never used.
1 Gas Fired "SURFACE COMBUSTION COMPANY" Hearth Furnace. Hearth depth 6' 6" x 36" wide x 22" high. Bottom fired. Excellent condition.
1 Oil Fired Hartly Double Hearth Furnace. 65" deep x 28" wide x 14" high. Bottom fired. Good condition.
1 Stewart Oil Fired Hearth Furnace. Mfg'd. by CHICAGO FLEXIBLE SHAFT CO. Hearth depth 6' x 36" wide x 24" high. Bottom fired. Excellent condition.

Reply Box 193, STEEL
Penton Building **Cleveland 13, Ohio**

IF METALWORKING PLANTS ARE YOUR PROSPECTS

STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment—Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, Ohio.

month ago but one more than a year ago. Idle stacks in the U. S. number 39 and in Canada 6.

Less Iron Produced in 1954

Blast furnace production (pig iron, ferromanganese, spiegeleisen) totaled 58,688,117 net tons, reports the American Iron & Steel Institute. Of the total, 58,119,382 tons were pig iron and 568,735 tons ferromanganese and spiegeleisen.

Output in the preceding year amounted to 75,842,759 tons, of which 74,987,721 tons were pig iron and 855,038 ferromanganese and spiegel. Production by districts last year was:

BLAST FURNACE PRODUCTION—1954
(Net Tons)

District	Pig Iron	Ferro-manganese & Spiegeleisen	Total
Eastern	11,991,652	203,485	12,195,137
Pittsburgh-Youngstown	19,822,027	247,070	20,069,097
Cleveland-Detroit	6,114,491	.....	6,114,491
Chicago	12,546,077	.....	12,546,077
Southern	4,849,616	105,266	4,955,082
Western	2,795,319	12,914	2,808,233
Total	58,566,513	568,735	58,688,117

December production was 5,586,513 net tons, of which 5,526,720 tons were pig iron, the remainder ferromanganese and spiegel. This compares with 5,778,840 tons in December, 1954.

Steel Import Prices

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast‡
Deformed Bars, Intermediate, ASTM-A-305	$5.50*	$5.50*	$5.50*	$5.78*
Bar Size Angles	5.25*	5.25*	5.25*	5.53*
Structural Angles	5.00*	5.00*	5.00*	5.28*
I-Beams	5.00*	5.00*	5.00*	5.28*
Wide Flange Beams	5.15*	5.15*	5.15*	5.43*
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	28.30	28.50	28.30	29.10
Barbed Wire (†)	6.05	6.05	6.05	6.23
Merchant Bars	5.50*	5.50*	5.50*	5.78*
Hot-Rolled Bands	6.00*	6.00*	6.00*	6.28*
Wire Rods, Thomas Commercial No. 5	5.40*	5.40*	5.40*	5.68*
Wire Rods, O-H Cold Heading Quality No. 5	5.85*	5.85*	5.85*	6.13*
Bright Common Wire Nails	7.15	7.15	7.15	7.45

‡Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling. †Per 63-lb, net, reel. *Nominal.

Sizes O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.38/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.68/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

Semifinished Steel . . .

Semifinished Prices, Page 104

Reflecting increasingly active demand for steel abroad, semifinished products are moving from this country and Canada to western Europe for the first time in a long while.

Export shipments of semifinished and plates to Europe confirm the view that a supply pinch prevails abroad. This view was formed only recently when imported steel prices were advanced here and deliveries from abroad became noticeably extended.

Slabs and billets are included in tonnage ordered here by European buyers with substantial volume moving to western Germany. Recently an estimated 10,000 tons of Canadian slabs were loaded aboard the *S. S. Frederic A. Eilers* at Port Richmond, Philadelphia, for shipment to Holland. This steel came by rail from Hamilton, Ont.

Warehouse . . .

Warehouse Prices, Page 109

Distributors in several districts, including Philadelphia, have advanced prices on hot-rolled alloy bars because of recent advances in mill prices. The latter reflect higher cost of alloys used.

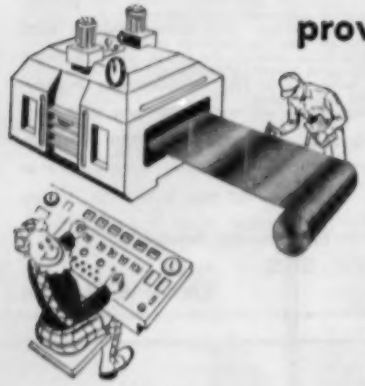
Demand for warehouse steel lags, although some distributors report business this month is better than a year ago. Volume is slightly larger than it was in fourth quarter, due to a larger number of small orders and some broadening in the product base. Sheets remain the most active item on the list. Warehouses in the Boston area are advancing quantity extras on orders for 200 lb and less.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 119

Foundries are ordering coke for February shipment in better volume than was the case for January delivery. The latter month, however, showed a gain over December business.

MicroRold® Stainless Steel "Thinness Control"



provides strip *Quality* in SHEET *Sizes*

Remarkable uniformity of gauge in MicroRold Stainless Sheets up to 36" wide.

The "Thinness Control" used in the manufacture of light gauge MicroRold Stainless Sheets assures you of the *same* dimensional accuracy as in strip stainless. Specified gauge thicknesses may be rolled in sheet sizes with tolerances as low as 3% average (plus or minus) as compared to the A.I.S.I. allowable of plus or minus 10%. This results not only in weight savings but also in fabricating economies.

Regular use of MicroRold Sheet can give you more stainless area per ton or the equivalent area with lesser weight.

MicroRold Stainless Steel Sheets are available up to 36" wide and in gauges from .005 in commercial grades, finishes and temper.

Ask your steel warehouse distributor for MicroRold with "Thinness Control"

Washington Steel *Corporation*

Washington, Pennsylvania

Advertising Index

Acme Chain Corporation 5
Aero Research Instrument Co., Inc. 118
Allen Manufacturing Co. 56
Allis-Chalmers Manufacturing Co., The Buda Division 99
American Zinc, Lead & Smelting Co. 101
American Zinc Sales Co. 101
Armstrong-Blum Mfg. Co. 33
Avondale Marine Ways, Inc. 110

Baldwin-Lima-Hamilton, Standard Steel Works Division 11
Barry Corporation, The 27
Bethlehem Steel Co. 1
Blanchard Machine Co., The 66
Browning, Victor R., & Co., Inc. 116
Buda Division, Allis-Chalmers Manufacturing Co. 99
Buffalo Forge Co. 29

Carpenter Steel Co., The 14
Cincinnati Milling Machine Co., The, Process Machinery Division 45
Cincinnati Shaper Co., The 15
Cleveland Crane & Engineering Co., The 80
Cleveland Steel Tool Co., The 118
Colorado Fuel & Iron Corporation, The, Wickwire Spencer Steel Division 28
Cone Automatic Machine Co., Inc. 17
Cowles Tool Co. 118
Cross Co., The 61

Denison Engineering Co., The 26

Eastern Machine Screw Corporation, The 116
Electric Equipment Co. 125
Enterprise Galvanizing Co. 116
Estabrook & Co. 116
Eureka Fire Brick Works 121

Federal Bearings Co., Inc., The 25
Fischer Special Mfg. Co. 103

General American Transportation Corporation, Parker-Kalon Division 13
Great Lakes Steel Corporation 80
Grieder Industries, Inc. 77

Halldon Machine Co., The 12
Heald Machine Co., The ..... Inside Front Cover
Heroslte & Chemical Co. 96

Industrial Brownhoist Corporation 90
Inland Steel Co. 36
International Nickel Co., Inc., The 34
Iron & Steel Products, Inc. 125

Jones & Lamson Machine Co. 21, 22, 23, 24
Jones & Laughlin Steel Corporation 7

Kearney & Trecker Corporation 63
Kawaneer-Ross Corporation 2
Keystone Steel & Wire Co. 10

Lavallee & Ide, Inc. 57
Lindberg Engineering Co. 30
Logemann Brothers Co. 123
Lovejoy Flexible Coupling Co. 116
Lurie Brothers & Co., Inc. 120

McKee, Arthur G., & Co. 85

Marchant, Geo. F., Co. 114
Master Electric Co., The ..... Inside Back Cover
Mesta Machine Co. 83
Midvale Co., The 4

National Steel Corporation 50
New Jersey Zinc Co., The 53
Niagara Machine & Tool Works 8, 9

Osborn Manufacturing Co., The 3
Ottawa Steel Products, Inc. 6

Parker-Kalon Division, General American Transportation Corporation 13
Pittsburgh Steel Co., Thomas Strip Division 78, 79

Republic Steel Corporation 18, 19
Revere Copper & Brass, Inc. 75
Russell, Burdsall & Ward Bolt & Nut Co. 54
Ryerson, Joseph T., & Son, Inc. 30

Standard Steel Works Division, Baldwin-Lima-Hamilton 11
Sterling Wheelbarrow Co 124
Stulz-Sickles Co. 16
Sun Oil Co., Industrial Products Department 58

Thomas Flexible Coupling Co. 112
Thomas Strip Division, Pittsburgh Steel Co. 78, 79
Timken Roller Bearing Co., The ..... Back Cover

Ward Steel Co. 6
Washington Steel Corporation 126
Wheland Co., The 128
Whiting Corporation 115
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 28

~ ~ ~

Table of Contents, Page 5

Classified Advertising, Page 125

A NAGGING WIFE MAY SAVE YOUR LIFE

IF YOU ARE OVER 45 and your wife keeps insisting that you should have *two* chest x-rays every year... don't blame her. *Thank* her! Semi-annual chest x-rays are the best "insurance" you can have against death from lung cancer.

The cold fact is that lung cancer has increased so alarmingly that today you are six times more likely to develop lung cancer than a man of your age 20 years ago. Our doctors know that their chances of saving your life could be as much as ten times greater if they could only detect lung cancer before it "talks"... before you notice any symptom in yourself. That's why we urge you to make semi-annual chest x-rays a habit—for *life*.

To see our new life-saving film "The Warning Shadow" call the American Cancer Society office nearest you or simply write to "Cancer" in care of your local Post Office.

American Cancer Society

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

Quantity
PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

only MASTER offers you a choice

DYNAMIC UNIBRAKE MOTORS

In Master Type D Unibrakes, dynamic braking is obtained with a unique, patented brake winding superimposed on the stator winding of any Master single phase or polyphase AC induction motor. This provides dynamic braking for AC motors with no outside source of DC current required.

ADVANTAGES. Type D, Dynamic Unibrakes are very simple and compact, and as the brake has no moving parts, there is nothing to wear . . . nothing to adjust . . . braking torque remains uniform.

SIZES. Now available up to 30 horsepower . . . larger ratings are being developed. Master Gearmotors and variable speed drives can also be supplied with Type D Unibrakes.

MAGNETIC UNIBRAKE MOTORS

Type M Unibrakes have electro-magnetic brakes of the friction disc type built into a continuation of the motor end cover, on the end opposite the regular shaft projection. Electric brake and motor form a compact, integral unit.

ADVANTAGES. Type M Unibrakes are ideal for applications where quick or controlled stopping is required. They are particularly desirable on such applications as elevators, hoists, inclined conveyors, etc. where it is necessary to hold the load.

SIZES. Available from ⅛ to 150 horsepower and for practically any type Master motor. Master Gearmotors and variable speed drives can also be supplied with Type M Unibrakes.

TIMKEN® bearings on the axles take shock loads of 110-ton ore car

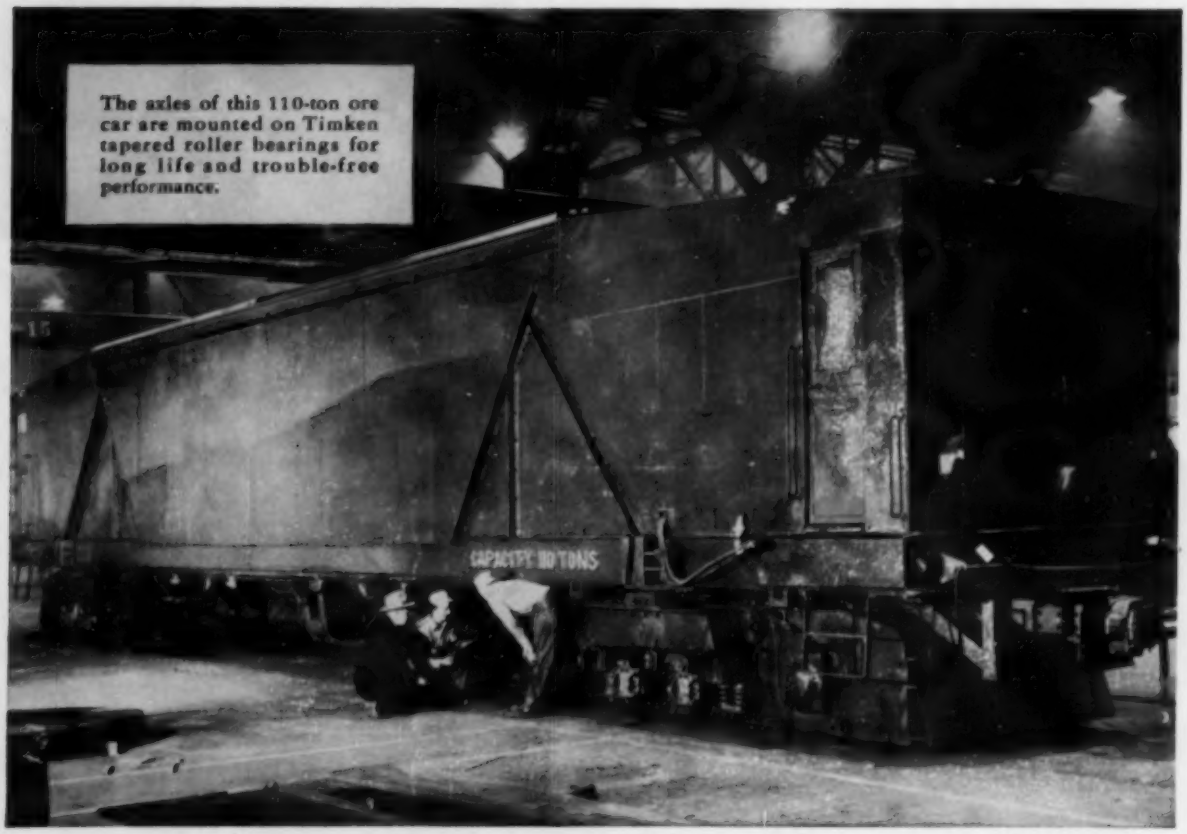
WHEN 110 tons of iron ore are dumped into the ore car pictured below, heavy shock loads hit the bearings on the axles. And when the car bounces over rough track, the bearings have to take repeated shock loads. That's one of the main reasons Timken® tapered roller bearings are used on the axles of this ore car and others like it in a large eastern steel mill.

Timken bearings easily take heavy shock loads because they are case-hardened so that they have tough, shock-resistant cores under hard, wear-resistant surfaces. They take the heavy pounding an ore car gets with minimum time-out for maintenance and repair. And because of full line contact between rollers and races, Timken bearings have extra load-carrying capacity.

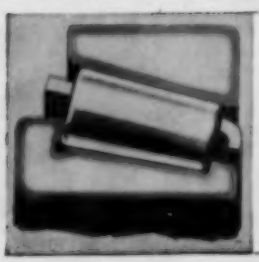
It's easy to start an ore car with Timken bearings on the axles. Timken bearings cut starting resistance 88%. That's because their true rolling motion and smooth surface finish practically eliminate friction.

And since Timken bearings are tapered, they take any combination of radial and thrust loads without the need for costly auxiliary thrust bearings. So whether you're building or buying mill equipment, make sure you get all the advantages only Timken bearings can give. For longer life, less friction, minimum maintenance, always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



The axles of this 110-ton ore car are mounted on Timken tapered roller bearings for long life and trouble-free performance.

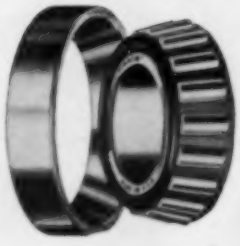


HARD ON THE OUTSIDE, TOUGH ON THE INSIDE

Rollers and races of Timken bearings are case-carburized to give a hard, wear-resisting surface and a tough, shock-resisting core. Result: longer bearing life.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS